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ABSTRACT

To help predict physical, mental, and social behavior problems in school age children, this longitudinal study intended to identify the origins of dysfunction and the characteristics which put infants at high risk for future problems. The study provided background data for the development of an operational screening and assessment method. The mothers surveyed were primaparous and were receiving medical care during the pregnancy. Data were collected during the eighth month of pregnancy and five times within the infant's first year, from 193 mother-infant pairs. The following assessment methods were used: mother questionnaire, father questionnaire, mother interview, observation of environment, observation of parent-child interaction, developmental testing, and pediatric examination. Four mediating predictor variables formed a conceptual framework for the study: infant characteristics, infant's environment, parental perceptions, and mother's life change. An Optimal Parent-Infant Profile was presented as a compilation of information identified as being important during pregnancy and the first year of life. The Profile included variables related to the mother and family, psychosocial support, life change, parents' developmental expectations, mother's health, mother's perception of the infant, infant's health and sleeping behavior, mother-infant interaction, and home environment. Results clearly indicate the parents' major role in shaping the child's behavior. However, the ultimate goal of predicting high risk children can only be realized when data are collected beyond the age of one year. (CP)

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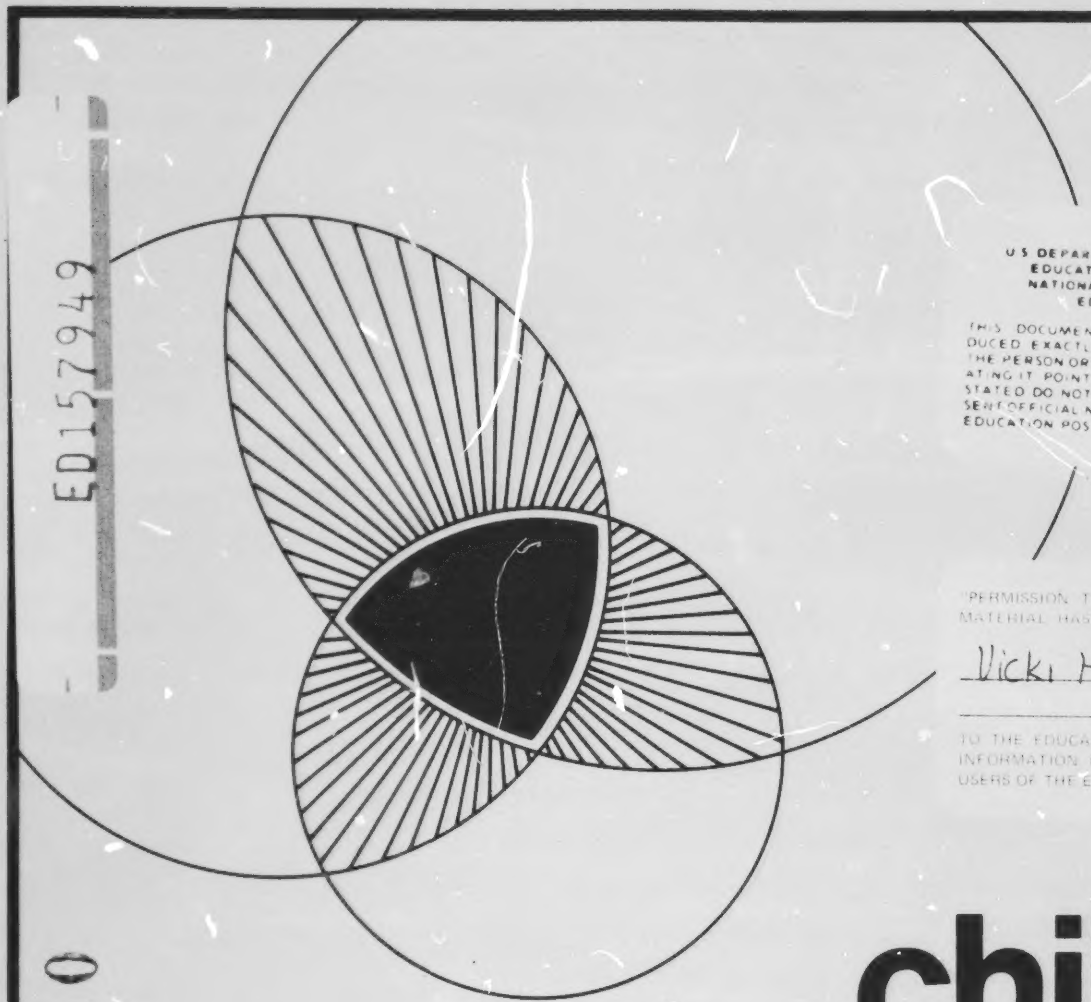

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# child
# health
# assessment

## part 2
## results of the first twelve months of life

# NURSING CHILD ASSESSMENT PROJECT

## FINAL REPORT

# RESULTS OF THE FIRST TWELVE MONTHS OF LIFE

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May, 1977

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# FOREWORD

The Nursing Child Assessment Project was an exciting and challenging effort for the faculty, staff and consultants involved. We think the work detailed in this report has broken ground upon which to build more responsive and sensitive health care services for families and children.

The results clearly indicate the major role the child's parents have in shaping the child's environment and behavior; yet our system of health care is heavily focused on the child, particularly in assessment and screening.

The measures developed and used in this study to observe and find out about the child and her environment through the first year of life provide the nursing and health care community with valid and reliable means of observing and asking about important conditions and characteristics. The importance of support for the child's caregivers becomes an obvious preventive health measure.

We are indebted first of all to the Division of Nursing, Health Resources Administration, Department of Health, Education and Welfare for their support in carrying out the work of the contract. Special appreciation is in order to Dr. Doris Roberts, formerly Chief of the Nursing Practice Branch, Division of Nursing. Her firm commitment to reliable and valid assessment measures as an avenue to improve nursing practice made the task worthwhile. It was due to the belief the Division had in the merits of such work that we were permitted the necessary developmental time. We especially thank Jessie M. Scott, Susan Gortner, and Harriet Carroll. The rigor and comprehensiveness of the study's approach is highly regarded by all who have been involved or in contact with the effort.

As principal investigator on the project, I would like to formally recognize all the project staff who so loyally and skillfully carried out the work. While many of the "team" are recognized in their authorship role for this report, the ideas, plans and work of this project were contributed by all. The Nursing Child Assessment Staff was:

| | |
|---|---|
| Mary Abbs | 1971 - 1976 |
| Barbara Clark | 1973 - 1976 |
| Bernice Collar | 1971 - 1976 |
| Sandra Eyres | 1975 - 1976 |
| Constance Macdonald | 1972 - 1973 |
| Sandra Mitchell | 1973 - 1976 |
| Charlene Snyder | 1971 - 1976 |
| Anita Lendzion Spietz | 1971 - 1976 |
| Beverly VanderVeer | 1971 - 1974 |

We were inspired and instructed by consultants from a variety of disciplines. The result of their advice is reflected in the comprehensive yet structured study design and measures. We wish to gratefully acknowledge their contribution to the work of the project. The consultants were:

Heidelise Als, Ph.D., Harvard University
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Ross Parke, Ph.D., University of Illinois
Evelyn Thoman, Ph.D., University of Connecticut
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A most important aspect of this study was the families who participated. We thank them for their cooperation. It was through the Group Health Cooperative Association of Puget Sound the families were recruited to the study. We wish to formally acknowledge the assistance of the Group Health administrative, nursing and medical staff for their contributions.

Finally, we acknowledge the continued support of the University of Washington in promoting the advancement of knowledge. The administrative support from the School of Nursing, Rheba de Tornyay, Ed.D., Dean, and from the Child Development and Mental Retardation Center, Irvin Emanuel, M.D., Director, has been substantial and sustaining.

Kathryn E Barnard

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# CHAPTER 1

# BACKGROUND

At present, too many children reach school age with problems which no one has diagnosed or been able to remedy. The object of our current project therefore has been to try to assess infant and early childhood care systems accurately, so as to begin appropriate preventive activities when possible.

In order to reach our objective, we must meet two major requirements.

1. First of all, we need more factual knowledge about the earliest beginnings of dysfunction and about those characteristics of infants which put them at high risk for future problems. Such knowledge must be firm enough to show us what to assess, what findings present potential problems, and what can be done to help.

In particular we need to know much more about the effects of the child's environment and how he interacts with his world. What difference may it make, by the time he goes to school, if he has a great deal of environmental stimulation and social interaction during infancy? Will the amount of stimulation he has had be related to his developing characteristics and the way he reacts with his caretakers? Does the way parents behave with children vary according to what they expect, and to what they perceive at the time of a child's birth? After they have come to know their baby, have their perceptions and expectations changed? Do babies of differing temperaments call forth correspondingly different behavior from the parents? And, finally, does the quality of parent-child interaction during early infancy prefigure later ways in which the child will relate to his environment?

Although these and similar questions still await answers, there is some evidence available now to show that the child, his world, and the interactions between the two affect one another as they develop. To meet the objective of our project, however, we must collect still stronger evidence to build a firm knowledge base that we can use in pinpointing and describing these interrelationships.

2. Second, we need operational screening and assessment methods for nurses, physicians, educators, psychologists, and other personnel to use in identifying infants at high risk of future developmental problems.

The many screening and assessment methods previously devised lend themselves better to research than to service settings, better to case-finding than to prediction. As yet we lack useful, objective ways to assess such infant characteristics as adaptability, typical physical activity level, sensitivity, and attentiveness. We also lack meaningful, accurate ways to measure such parent characteristics as perceptions of the child, attitudes toward child rearing, teaching styles, and concern about child behavior. The greatest lack of all, however, is our inability to measure the child's interactions with such important aspects of his environment as how during his infancy his mother relates to him, and how he responds.

To meet our objective, however, developing adequate measurement methods is only one part of the problem. We must also know what kinds and combinations of information are useful in predicting long-term outcomes, which ones are feasible for use in service settings, and which ones can be depended upon for decision-making. When found, such operational screening and assessment methods can provide a clinical data base for recognizing current difficulties, for predicting long-term problems, and for establishing preventive and remedial services for individual children.

When screening and assessments can be applied systematically to the child population, several critical benefits will follow: interdisciplinary intervention programs, better administrative decisions about service resources, and a factual baseline for evaluating services.

In summary, then, our long range goal is to strengthen preventive care for school-age children so as to minimize health and adaptive behavior problems. This can best be accomplished through increasing our knowledge bases about the origin of these problems in the early developmental years.

Health protective supervision of young children is viewed as a necessity in our society (White House Conference on Children, 1970); professional prescriptions for the frequency of care contacts reflect the concern for close monitoring, especially during the early infant period of rapid growth and development (American Academy of Pediatrics, 1972).

How can the resources of the systems for early child health care be more effectively brought to bear on the problem of school-age health, learning and behavior disabilities? There are many difficulties relating to the distribution of care facilities and the special needs of underprivileged subpopulations as outlined by the 1970 White House Conference on Children.

The reported prevalence of young school children with problems interfering with learning or adjustment varies from 10 percent to 55 percent (Denhoff, Hainsworth and Hainsworth, 1972; Rogolsky, 1968-69; Lessler, 1972).

Recent trends have provided new perspectives on how children at high risk of developmental problems may be better identified and helped.

For example, the recent cumulative findings about how children develop the ability to learn and to relate to people and things in their environment represent important epidemiological knowledge which has not yet been applied to the care system. In 1967, Caldwell, a professor of child development and education, reviewed what was known about the optimal learning environment for young children. Up to that time studies had focused on "maternal deprivation" in institutional settings and collectively showed these children to be "less socially alert and outgoing, less curious, less responsive, less interested in objects, and generally less advanced" than home-reared children (p. 10). There was little investigation about the effects of differing environments within the more usual home setting.

Although cognitive development, usually as measured by an intelligence test, has been a subject of study for many years, only recently have we recognized that children exhibit different ways of adapting to and responding to the environment as early as birth (Brazelton, 1973). And, immediately after birth, babies begin the acquaintance process with others; of particular importance is the way they attach to the caretaking parents (Klaus, Jerauld, and Kreger, 1972; Kennell, Jerauld and Wolfe, 1974; Kimball, 1967; Kennedy, 1973). In the first weeks of life they establish ways of behaving reciprocally with their mothers (Thoman, 1975), and the quality of interaction with their animate and inanimate environments as they continue the learning, growing, developmental process from birth to 3 years of age correlates with later learning behaviors and cognitive skills (Yarrow, Rubenstein and Pedersen, 1971; Elardo, Bradley and Caldwell, 1975).

In the late 1960s and early 1970s, the work of Yarrow and his colleagues at the National Institute of Child Health and Human Development made a strong contribution to understanding cognitive and motivational development in early childhood. A framework they have suggested for the influences on child development is quoted here because of its congruence with other contemporary findings and its useful perspective for preventive child care.

> . . . early influences operate through a sequential chain of mutual interactions between the child and the environment. If the early environment encourages motivation to interact actively with people and to explore objects, it may set in motion a sequence of interactions which may be self-reinforcing and thus self-perpetuating. Inherent in this interpretation is the view that the child's intellectual and personal-social development occurs in a field of reciprocal interactions with people and objects in his environment. The infant affects his environment, not simply by selectively filtering stimulation through his individualized sensitivities, but also by reaching out and acting on the environment. (Yarrow, Klein, Lomonaco and Morgan, 1974, p. 13, 14).

Only recently have techniques become available to define and quantify the qualities of infant environment such as maternal perception of the newborn (Broussard and Hartner, 1971), the developmental stimulation which objects and persons present (Yarrow, Rubenstein and Pedersen, 1975; Elardo, Bradley and Caldwell, 1975), and the ways in which infants and parents interact (Thoman, 1975; Yarrow, Rubenstein and Pedersen, 1971; Bronson, 1974). These observational techniques enabled studies which increase knowledge about the early epidemiology of child physical, cognitive, social and emotional development. They also hold promise that we may use similar techniques in clinical practice to help children.

Prediction in child development has been uncertain, partly because the results of commonly used methods of assessment such as developmental tests show instability over time during the early years of life (Bayley, 1970). There has been considerable concern that the dimensions being measured by these tests in early childhood are different from those which can be tapped after two years of age (Rutter, 1970). Since the early years are so important in establishing patterns of behavior, motivation, and learning, it means we must know the precursor dimensions which need to be assessed to activate preventive care. We cannot emphasize too strongly that, if we wait until the results of tests in later years show developmental delays, the process of assessment becomes casefinding rather than predictive prevention.

In recent years there has been increasing emphasis on preventive health care and health maintenance activities. They were reinforced for children when Congress passed the 1967 amendments to Title XIX of the Social Security Act; under this act screening, diagnosis and treatment for children of medically indigent families was added to Medicaid. The resulting program, Early and Periodic Screening, Diagnosis, and Treatment (EPSDT), is administered locally; program contents and activities vary across states. The general intent, however, is described in a guide for EPSDT programs by Frankenburg and North (1974) under the auspices of the American Academy of Pediatrics. This is a thoughtfully prepared protocol suggesting the optimum screening of children from birth to 21 years.

If one examines this protocol as an authoritative guide to what problems should be screened for, methods for the following are included: immunization status, dental disease and care, eye problems, hearing, growth, development, tuberculin sensitivity, bacteriuria, anemia, sickle cell diseases, lead absorption. A physical exam is also advised, as is an interview with the mother. For the very young child these last two procedures are focused on age-relevant physical problems, the family's health history, possible child abuse, feeding, sleeping, and selected developmental behaviors appropriate for chronological age.

If one examines the EPSDT guide to determine the current state of the art in screening measurement, it is evident that there is unevenness of capability across conditions. For some problems such as vision, hearing, and anemia, we have methods to quantify and norms against which to make decisions about normalcy in the clinical setting. For other problems less progress has been made. For example, Frankenburg and North evaluate the methods of screening for emotional problems as few and unvalidated. They advise local psychologists and psychiatrists to go about it in whatever manner suits them individually. As far as mother-child interaction is concerned, there is one item on the physical exam for children 2½ years to 10 years, "mother's and child's reaction toward each other during examination," which the examiner is to rate as normal or abnormal. For younger children the item scored similarly is "mother's attentiveness to child's comfort and safety during examination."

The EPSDT screening protocol exemplifies the need to incorporate new knowledge and techniques and to broaden the disciplinary base to attack child developmental problems.

Current screening and assessment practices for young children have been questioned for their focus on the physical aspects of well being and their adherence to the medical model (Meier, 1973). Although no one doubts the importance of physical health maintenance, there is now a realization that it is only one of the aspects of child health which requires attention (Trotter, 1975).

With increasing awareness of health manpower shortages and maldistribution, there has been a growing effort to make maximum efficient use of personnel at all levels and from all types of training. This drive has been accompanied by spokesmen for the complementarity of roles (Bates, 1972) and the need to utilize broadly the foci of different disciplines. Along with greater utilization of non-professional members on the health team, the roles of professionals have been realigned. In the field of maternal-child health, nurses have been assuming increasing responsibility for the care of children, especially for supervision of their growth, development, and health maintenance early in life and before the development of acute conditions or dysfunction. This development is a logical one: nurses are the health professionals with whom children most often come in contact during infancy. These contacts are made in many settings: maternity wards and nurseries, well child clinics, pediatricians' offices, and in the children's own homes.

The availability of human resources and the evolution of roles within care systems are only part of what should determine the appropriateness of personnel for a job; it is also necessary to consider the disciplinary skill relevant to the needed care. An understanding of normal child growth and development has long been a part of nursing education. Of even greater importance are the nurturant activities and supportive skills most likely to be required in helping families and their children with characteristics that put the child at higher risk for health, learning, and behavior disorders. Several studies have shown the effectiveness of nurses in the area of maternal-child care (Chappell and Dragos, 1972; Hoekelman, 1975). At the same time, studies also indicate room for improvement (Korsch, Negrete, Mercer, and Freemon, 1971).

During the 1960s, the Division of Nursing of the U.S. Public Health Service was mindful of the problems of young children, the trends in health manpower, and the potential benefit that nursing could bring to child development care. Intramural work was undertaken consistent with the aim of increasing the scientific basis of nursing practice and the use of systematic techniques for problem identification. This work included an experimental test of the use of the Denver Developmental Screening Test in community nursing care settings. The results demonstrated the complexities of identifying developmental problems in infancy, the need for a broader conceptual approach, and the necessity of an increased armamentarium of child assessment methods for nurses.

Continuing the motivation to make early identification of children with potential developmental problems a systematic part of nursing's repertoire, the Division of Nursing sponsored a related effort built on their past experience. In 1971 the Division contracted with the University of Washington[1] to develop and test systematic methods for nursing assessment of the health and development of infants and young children. A

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[1] Contract #NIH-71-4174
Project Officer 1971-1974 Dr. Sandra Eyres, Division of Nursing
1974-1976 Dr. Susan Gortner, Division of Nursing

Principal Investigator 1971-1972 Dr. Madeleine Leininger
1972-1976 Dr. Kathryn Barnard

summary of the contract scope of work follows:

1. To review existing research to identify factors associated with child health and development, to evaluate instruments and methodologies providing for the measurement of those factors, and to draw implications for the process of nursing assessment and intervention.
2. To develop a format for nursing assessment by selecting factors offering a profile of the health and developmental status of the infant and preschool child and by utilizing the measurable attributes.
3. To test feasible assessment formats in a longitudinal study of a cohort of infants and mothers to determine the inter-observer reliability of the assessment methods, the relationship of maternal and infant characteristics during the first year of life to infants' health and developmental outcomes at one year of age, the most efficient methods for testing those factors showing a relationship with infant outcomes; the validity of the nursing evaluations compared with other standard ones; and the subject variability between assessments.

In order to accomplish the charge of the contract, a period of fact finding, exploration, synthesis and planning was undertaken. The specific aims of this period were:

1. To explore the current trends in health care programs so that the methods developed would be compatible in the context of services.
2. To establish, through review of literature and consultation with current investigators, a knowledge base in the fields related to child health and development.
3. To specify the child health and development problems which the methods

would be designed to assess.

4. To determine the high risk characteristics of the problems necessary to identify target groups for preventive care.
5. To find the existing tools and measurements for the problems and high risk characteristics most suitable to service based on validity, reliability and feasibility.
6. To design the next study phase based on a synthesis of the findings.

## CHILD SCREENING AND ASSESSMENT IN HEALTH CARE

Contact with agencies providing care for infants and their families and a survey of the relevant literature brought into focus several issues pertinent to the applicability of this project:

a. There is an upper limit on the resources of child care systems. The most urgent question is how to allocate the available care resources to the infants and families most in need of them so as to do the most good.
b. In order to make decisions about care distribution and methods, an information base is needed to document budgetary requests and plan clinical activities. Because there is discontent with traditionally used data, interest exists in broadening information to include social and environmental factors as bearing on child development and care.
c. In the process of providing care, extensive information about infants and families accumulates. Much [illegible] this information, however, does not have the same meaning across practitioners and/or families, is not part of a systematic problem identification program or is not utilized in decision making. When it is used for decision making,

the rules often differ across practitioners and/or families.

d. Systematic child screening for health and developmental problems is receiving increasing attention as a means of obtaining the needed information for decision making. Although the appeal is strong, numerous warnings have been voiced about the level of personnel required, the difficulties in predicting child problems well enough to legitimately eliminate a low-risk group from follow-up, the inefficiency of concentrating all resources on a high risk group, the wastefulness of unevaluated screening activities, the need to accompany screening with adequate diagnosis and treatment, and the social, ethnic, and ethical considerations surrounding screening norms and labels (e.g., Rogers, 1971; Meier, 1973; Alberman and Goldstein, 1970; North, 1970).

e. Although screening is usually considered a problem-finding activity initiated by the care system, there is some evidence that the process of problem identification during care contacts which the family has initiated also needs improvement. Routine clinical information gathering could be improved, especially for psychosocial and developmental problems, through systematic consideration of parental concerns (Korsch, Gozzi and Francis, 1968; Korsch, Negrete, Mercer and Freemon, 1971; Barnard and Collar, 1973).

In preparing to devise screening/assessment formats for child developmental problems, we have heeded these various findings, trends and opinions. In defining screening we have followed the lead of Lessler (1972):

> Screening is the acquiring of preliminary information about characteristics which may be significant to the health, education,

> or well-being of the individual, and which are relevant to his life tasks. The means of data collection must be appropriate and reasonable with regard to the economics of time, money, and resources for dealing with large numbers of persons. (p. 193).

Assessment, as we use the term, refers to a second level of problem identification; applied to a high-risk group it attempts to define more exactly the problem or possible causes so that appropriate care can be given. While screening is applicable to the total population at risk, assessment activities are more appropriate for those with a recognized potential problem, often within a formal care structure.

The information-gathering process in screening, besides being the first step, is systematic and statistical in approach. Clinical assessment applies more artistry and professional acumen in eliciting information and synthesizing conclusions. The clinician seeks any and all information considered pertinent, the better to understand individual variations.

Because screening is applied to a larger population, the level of expertise required to be feasible and the cost per information-gathering contact should be less than for assessment contacts. Because screening is a primary technique, the probability of finding specified problems is less per contact than for assessment.

There are also differences in the evaluation of these two major problem-finding activities. Screening methods are usually tested against more thorough diagnostic findings for the ability correctly to identify people with the problem (sensitivity) and the ability correctly to identify people without the problem (specificity). Peer review is more typically used to evaluate the quality of deeper assessment activities.

Some of the differences in perspective between screening and clinical assessment are summarized in Figure 1.1. These dichotomies, however, are not always found in the real world; some flexibility in operationalizing problem-finding systems is desirable. For example, screening need not be restricted to public health mass programs; systematically obtaining preliminary information is a useful routine step in nurseries, in maternity wards, and in well-child care settings.

In pursuing the analysis and therapy of child problems a flow from lesser to greater training and specialization is envisioned. Figure 1.2 shows this screening and assessment process. This diagram was based on a) the need to make the best use of lesser trained health personnel, b) the risk factors which have already been studied which allow certain target groups of children to be delineated, c) the time-consuming nature of more definitive assessment and testing, and d) the greater expertise required for more complex assessment and diagnosis. The various stages shown in this health care model do not represent departures from existing systems. Rather, they represent guidelines for the project in order to be compatible with today's trends in health care.

The designation of high-risk need not be done with an excluding or selective screening intent; those children falling in low risk categories need not be excluded from care or subsequent problem identification. One of the major advantages of a sound primary information system in our view is the opportunity to design different types or patterns of care for different people. When families of different educational, economic, and social backgrounds show different types and amounts of childhood problems, there is little support for the belief that there is a single definition of optimum care.

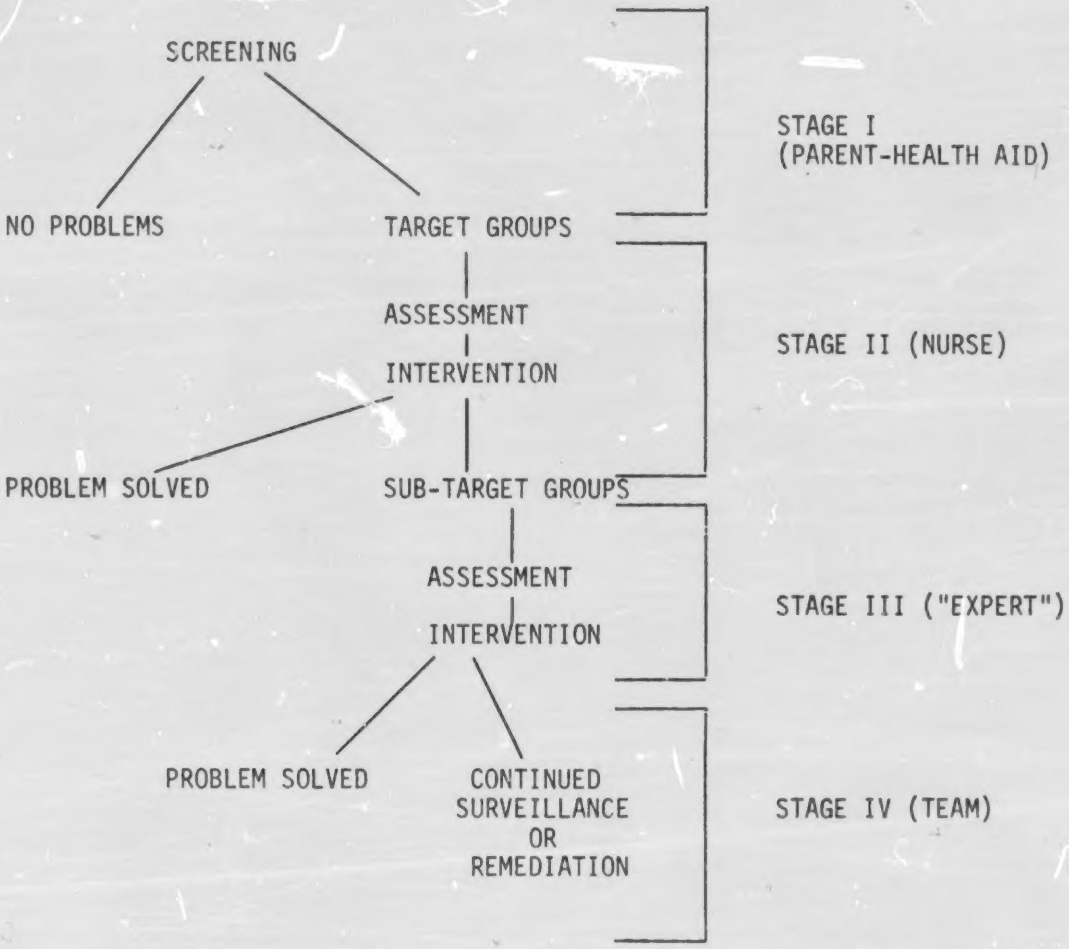
FIGURE 1.1

## SOME DIFFERENCES IN PERSPECTIVE BETWEEN SCREENING AND CLINICAL ASSESSMENT

| | Screening | Clinical Assessment |
|---|---|---|
| Purpose | to get under care | to diagnose and treat |
| Population | at large<br>public health | care utilizers |
| Information gathering | first or primary contact | secondary to first filter |
| | individual evaluated against probability statistics with specific routines | more individual variation evaluated - diagnostic artistry |
| Level of expertise | less | more |
| Resources required per individual | less | more |
| Probability that there is or will be a problem | less | more |
| High risk factors and problems identified | specified | unlimited |
| Tests of accuracy | validity tests for sensitivity and specificity | peer review techniques |

FIGURE 1.2

HEALTH CARE MODEL


SCREENING
NO PROBLEMS
TARGET GROUPS
ASSESSMENT
INTERVENTION
PROBLEM SOLVED
SUB-TARGET GROUPS
ASSESSMENT
INTERVENTION
PROBLEM SOLVED
CONTINUED SURVEILLANCE OR REMEDIATION
STAGE I (PARENT-HEALTH AID)
STAGE II (NURSE)
STAGE III ("EXPERT")
STAGE IV (TEAM)

We concur fully with the need to accompany problem identification with appropriate intervention. There is no point in finding problems for which no care is given. In this regard, it is important to link the development of screening/assessment formats with knowledge of what can be done to help.

## CURRENT KNOWLEDGE IN CHILD HEALTH AND DEVELOPMENT

### Developmental Outcomes

A review of the literature was completed, and extensive contact was made with research consultants from a wide range of disciplines. These efforts outlined the prevalent problems in child health and development, the state of knowledge about their precursors, problems in measurement, and issued that would have to be dealt with in operationalizing systematic assessment techniques. Since the published 200-page referenced report of the literature is available (Barnard and Douglas, 1974) only summaries are included in this report.

### Mental Development

By far the most common developmental outcome studied is mental development, usually measured by an intelligence test. Most broadly, "mental development" or "cognitive development" is taken to subsume the following: learning, reasoning, thinking, remembering, analyzing, developing concepts, and for some, language development. All tests which purport to assess mental development will touch on some or all of these skills. But by no means do all tests do so in the same manner.

There is a basic disagreement among those who devise assessment procedures as to the fundamental nature of the developmental process. The most common tradition assumes that mental development is basically a quantitative process: increments of knowledge or skill are added either directly as a result of growth, or as a result of interactions with the environment. If one begins with such an assumption, then the problem of assessment is one of sampling the normally acquired skills at several ages, and comparing the child with the "normal rate of acquisition." This assumption underlies the vast preponderance of tests for assessing mental development in both infants and older children, and is currently best represented in the Bayley Scales of Mental and Motor Development.

Alternatively, one may assume that mental development is basically a series of qualitative changes. The child does, of course, increase in skills and knowledge, but these are organized into new systems as development occurs. Each of these new systems is an outgrowth of the one which precedes it and, to assess a child properly, it is necessary to determine how far he has progressed along the series of stages of development.

Gesell and Piaget have emphasized qualitative changes in the developmental process. Although Piaget has not developed a mental scale per se, several of his American followers have begun to do so, e.g., the Infant Psychological Development Scale by Uzgiris and Hunt (1975). The fundamental purpose of such scales is to place each child at some level of the normal sequential pattern as compared to a criterion group. Such scales appear to hold more hope for diagnostic purposes than has been the case for infant or childhood "intelligence" tests.

In addition to standardized tests, there has been increasing use in recent years of a host of other measures, each tapping a single aspect of the child's functioning, and each hopefully predicting later cognitive development effectively. These include "attention span," "rate of habituation," and "activity rate."

Several physical factors have been identified as influencing mental development. Estimates on the contribution of heredity range from 40 to 80 percent, but there is agreement that the impact, at least on skills measured by standardized tests, is considerable. Physical states at birth and nutritional states during infancy and childhood also affect cognitive development; however inferences from studies of these factors are unclear due to confounding or mediating environmental influences.

Environmental factors such as parent education and social class, environmental impoverishment or enrichment, and compensatory educational programs are also associated with mental development. The research on these factors shows that more knowledge is needed of ways wherein the environment influences mental development and interacts with other factors.

A major problem in measuring mental capabilities has been the lack of correlation between tests during infancy and those done after two years of age. One of the strongest implications important to this project from reviewing the literature on mental development is this: if predicting mental development at school age is of interest, more is needed for prediction than ratings of the child's mental development in infancy. One must somehow simultaneously consider his physical health and the nature of the environment in which he is growing up.

## Social Development

Social development, often paired with emotional development, is probably the developmental outcome about which the least is known in terms of what is considered either "normal" or even generally desirable. Defining the term "social" is critical, since the term elicits such diverse associations as emotional illness and psycho-pathology, personality and temperament, "phases" of negativism or shyness, acculturation, and the presence or absence of such socially approved, personal-care skills as using a spoon. For the purposes of this project a broad range of behaviors has been defined as social, including those an infant brings into his world that may be expected to affect how others respond to him, as well as those behaviors which appear to be dependent on the behavior of others. We consider "emotional behavior" only within the broader context of social behavior. Although the arousal of emotions and manner of expressing them are closely related to experiences with people, we realize that there are distinctions between emotional and social behavior: not every emotional response is evoked by a social stimulus, and not all social behavior is associated with an emotional response. Contemporary research in infant development, however, recognizing that no process develops or appears independently in the young child, tends not to isolate either emotional, social, perceptual, cognitive, or learning processes from one another.

Current work on the social development and behavior of infants may be grouped in two broad categories: studies focused on how infant behavior is affected by various kinds of socially mediated inputs, and studies centered on the relatively stable individual characteristics of the infant which presumably affect the way others relate to him or her. It is clear that a single infant behavior, such as crying or smiling, may be studied by some as dependent on peoples' response to the infant, while treated by others as a characteristic which the infant brings into a social situation and which has a powerful effect on his environment. These approaches point up the essentially interactive character of social development.

A number of studies have attempted to demonstrate individual differences and stability in selected behaviors without, in some cases, explicitly trying to relate these behaviors systematically to any social consequence. Such studies have examined the tendency of neonates to respond to various kinds of stimuli, individual differences among infants in their response to soothing, individual differences in activity level, and differences in response to a fear-provoking situation. One characteristic in which infants differ markedly is behavioral variability itself. The unpredictable infant can complicate mothering because of the difficulty in timing maternal behavior appropriately.

Perhaps the best-known studies of stable individual differences among infants and their contribution to parent-infant interactions are those of Thomas, Chess, Birch, and Hertzig (1963). This group has identified nine categories of behaviors or characteristics that are relatively consistent during the first two years: activity level, rhythmicity or predictability, approach or withdrawal from new stimuli, adaptability to new or altered situations, intensity of reaction or energy of response, response threshold, quality of mood, distractibility from ongoing behavior, and attention span or persistence in the face of obstacles. An infant's "reactivity" pattern is composed of these nine elements. Various clusters of behaviors are discernible; for example, the "difficult" child exhibits irregularity, withdrawal from new situations, non-adaptability, intense responses, negative mood, and nondistractibility from ongoing behavior. This child's effect on his immediate social environment may well differ markedly from that of a child displaying medium activity, regularity, adaptiveness, approach tendencies to new situations, mild intensity of response, positive mood, distractibility from ongoing behavior, and persistence.

Another group of studies attempts to find out whether there are stable differences among the behaviors of mothers or other caretakers which can be related systematically to differences in infant behavior. In this approach, the infant's characteristics are considered the dependent variable, influenced by parenting practices and attitudes and various kinds of stimulation. Exemplary of findings from such studies are relationships between the quality of mother-child interaction and intellectual function of the child, between mothering behaviors and attachment of the infant to the mother, between caretaking and the child's ability to cope with stress, and between maternal responsiveness and infant crying.

Sometimes "social" tests include behaviors which might be considered communicative and cognitive, even though in practice an individual's social development score may be contrasted with his scores on language and mental tests. The most widely used, standardized instruments for assessing social development are those linking the display of adult-encouraged, personal-care skills to an age chronology. Such instruments include the Vinel and Social Maturity Scale, the Gesell Developmental Schedules, the Denver Developmental Screening Test, and the Developmental Profile by Alpern and Boll.

Although not specifically designated as tests of social development, the Infant Behavior Record from the Bayley Scales of Infant Development and the Ordinal Scales of Infant Psychological Development by Uzgiris and Hunt are also significant. The latter scales include one called the Scale of Vocal and Gestural Imitation. The degree to which an infant imitates important adults in his environment, as well as the maturity of his imitation, may well be related to the encouragement and delight such imitation receives. The research of Wachs, Uzgiris, and Hunt (1971) supports this hypothesis. Conversely, the infant who readily mimics what he views in others is thereby providing important social feedback, which influences others' reactions to him.

There is a great lack of data relating infant characteristics to behaviors observed in later childhood and to adult social functioning. The most useful current course appears to be to identify the behavioral characteristics on which infants vary while simultaneously relating social inputs from the environment to those characteristics. Such documentation would add to the needed predictive ability in a way which the studies of specific phenomena, e.g., response to strangers, cannot do. Defining and assessing social development is problematic because social outcomes are so closely tied to other developmental outcomes and because it is difficult to arrive at unbiased conclusions about "good" or "healthy" social functioning. Nevertheless, if screening and assessment methods that will locate and eventually provide help for potentially unhealthy children are to be constructed, some judgments cannot be avoided. The most critical behaviors probably are those whereby the individual can affect his social environment. The infant who possesses a limited repertoire of communication signals or social responses, or who lacks varied and systematic means of affecting or progressively changing his environment, is particularly disadvantaged.

## Language Development

Language has been defined as a code or system which speakers have learned. Such a code includes four distinct aspects: (1) phonology--the specification of units of sound (phonemes) which compose words and other forms in language; (2) morphology--the listing of words and other basic meaningful forms (morphemes) and the specification of the ways these forms may be modified and placed in varying contexts; (3) syntax--the specification of the patterns in which linguistic forms may be arranged and the ways these patterns may be modified or transformed in varying contexts; (4) semantics--the specification of the meanings of linguistic forms and syntactical patterns in relation to objects, events, processes, attributes, and relationships in human experience.

A language disability affects many aspects of a child's life. Failure to attain skill in language usage may hinder the child's overall learning capacity. Experiments have demonstrated the importance of language in cognitive areas such as concept formation, problem solving, thinking, and learning. Related to intellectual and cognitive development is the effect of a language disability on academic progress. In the early grades of school, the child may suffer in many areas because of the value that many classrooms place on the child's verbal ability. Emotional and social problems may also develop in the child with a language disability. Poor communication with adults and peers can result in frustration and feelings of failure.

There are prerequisites for communication, including certain anatomical systems by which to receive and produce speech stimuli. The potential intellectual capacity with which a child is born has been found to influence the rate, quantity, and quality of language performance. At the low extremes of intelligence, language may not develop. It has also been proposed that the neuro-physiological maturity of certain brain centers can influence the "readiness" for language development.

It appears that heredity and maturation account for the appearance of early oral behaviors such as babbling at 6 to 9 months, since these behaviors occur even in deaf infants or when there is no environmental language stimulation. The appearance of later developmental advances, such as the first word at approximately 1 year, appears to be the result of the addition of a third variable, environmental stimulation. Many studies have concluded that language is superior in quantity and quality in the upper socioeconomic levels. While socioeconomic status may be thought of as an intervening variable between environmental factors and language development, it is more significant to define those specific characteristics of family patterns and parental-child interactions which influence subsequent language behavior in children. Studies have shown relationships between the acquisition of language skills and factors such as models provided by the adults in the environment, the amount of exposure to adults, the degree of maternal permissiveness, and the "expanding" done by parents, i.e., repetition of the child s speech using a similar well-formed adult equivalent.

Emotional disturbances in children producing anxiety feelings or deficient self-concepts are found to be basic components in many types of distorted interpersonal verbal communications. Deficits in expressive and receptive language are associated with neurotic and psychotic disorders in childhood. Stuttering in young children, for example, has been associated with maternal compulsiveness, overprotection, and covert or overt rejection.

Nonverbal communication also has an important effect on the natural growth and progression of language.

Possible reasons for language disability are many. A deeper assessment is required to identify them and their beneficial therapy: among them are hearing loss; oral sensory deficit; dyslexia; minimal cerebral dysfunction; psychosis; behavior disorders; mental retardation; environmental deficits, such as sensory, emotional, and cultural deprivation or incompetent instruction.

The first year of life is an extremely important period for the development of communication patterns and pre-language skills. For example, smiling and eye contact are perhaps the beginning patterns of communication, and cooing and babbling may be a rehearsal for the first words. At the moment of the infant's first cry at birth, communication patterns and pre-language activity begin. Pre-language development involves: (a) all sounds related to crying present at birth which undergo modifications during childhood and persist throughout life, and (b) sounds emerging at 6-8 weeks, blending into acoustic productions of speech. These sounds begin with brief cooing noises, usually following the smiling responses. The infant's smiling provides information about an important communication signal that establishes social bonding between mother and infant. Social smiling may begin as early as the third week of life. After 4 weeks the smile is predictable. Eye-to-eye contact is "an interchange that mediates a substantial part of the non-verbal transactions between human beings" (Robson, 1968, p. 92). By the fourth week true eye-to-eye contact is effective, as in evoking a smile.

Although broad stages of language development (such as crying, cooing, babbling first words, and word combinations) have been identified for years, there is no systematic definition of the small progressive steps of language learning. Current tests, particularly screening tests such as the Denver Developmental, are concerned with a narrow range of linguistic behaviors. Through time constraints, the assessment of language development in screening tests fails to be comprehensive.

Current tests designed specifically to evaluate language development also have serious limitations. Due to the problem of cooperation in the young child, many language tests resort to the informant-interview method. Tests relying exclusively on the mother's reporting the child's language behaviors must, to be valid, have carefully worded questions and interviewers trained to prevent biasing of information. These tests by interview include the Developmental Profile, the Verbal Language Development Scale, and the Receptive-Expressive Emergent Language Scale.

Language tests which use direct observation of the child's language behaviors (e.g., the Receptive, Expressive, Phonetic Language Scale), often lack specific instructions for stimulus presentation and response requirements. Because examiners may vary in their method of stimulus presentation and their criteria for evaluating responses, such instruments have doubtful reliability.

Another limitation evident in some current tests, such as the Utah Test of Language Development, which may adequately assess language functions in children over 1 year of age, is that they ignore the important prelinguistic skills in the first year of life. An attempt to meet all these various deficiencies was made by Hedrick and Prather (1975) in their development of the Sequenced Inventory of Communication Development.

Before 2½ years of age a child's knowledge and use of language is difficult to assess. The ability to put words together in a meaningful pattern, perhaps the most important part of communication, is not functional until after that age. In the first two years the language skills expressed determine the focus of tests for the youngster, i.e., articulation, sound discrimination, and vocabulary size. As new development stages are reached, the tests can tap other dimensions of language ability. So perhaps it is not surprising that few predictive correlations result.

The relationships between language competence and environmental stimulation, such as the amount parents talk with the child, the encouragement they provide and the exposure to diverse experiences and objects, suggest another tack for prediction. Perhaps the environment would be a more useful predictor of language development than early language *per se*.

## Physical Growth, Development, and Health

Physical growth and development constitute one of the best studied outcomes in child health. Even though such growth, being influenced by environmental as well as genetic factors is complex, it is an extremely valuable index of a person's health and well-being.

By most definitions growth is the increase in size of cells, tissue, and body parts, while the process of development implies an increase in complexity, differentiation of tissue and function. Although children vary greatly in the rate at which they develop, in their tempo of growth, the organization of growth is normally a regular process. When this process is disrupted by environmental influences such as illness, malnutrition, or stress, growth may stop temporarily, yet will quickly proceed to "catch up" to the prior pattern when normal conditions are resumed.

Technically, the definition of "failure to thrive" is given as a rate of gain in length and/or weight less than the value corresponding to two standard deviations below the mean during an interval of at least 56 days for infants less than 3 months of age and during an interval of at least 3 months for older infants. An infant gaining in length or weight below the 10th percentile expected for his age should be regarded as "suspect" (Fomon, 1967, p. 11). The conditions generally associated with the problem of failure to thrive in the young child are: (1) inadequate food intake; (2) recurrent vomiting; (3) abnormally great fecal losses--food malabsorption; (4) high energy requirements; and (5) stress which causes increased cortisone output.

There is another common growth problem in which physical measurements are clearly abnormal: low birth weight. Weight at birth and gestational age have traditionally been used as the chief indicators of the adequacy of intrauterine growth, and "premature" was the word used to describe infants below the norm in either or both dimensions. An important attempt to distinguish between these two was the WHO recommendation that "low birth weight" be applied to infants weighing 2,500 grams or less at birth, while "premature" should be reserved for infants whose gestational age was less than 37 weeks.

In a recent publication, Owen (1973) reported on a conference on the Assessment and Recording of Measurements of Growth of Children held at the American Academy of Pediatrics in November, 1971. The group of experts examined the measures of physical growth in use in the United States and concluded with a number of recommendations. Height, weight, and head circumference were the dimensions suggested for measurement. Skinfold thickness was excluded through the cost and technical difficulties involved in its use and through the absence of reference standards for this variable. The suggestion for frequency of measurement of these three recommended factors (i.e., height, weight, and head circumference) was that they be measured at birth, before newborn hospital discharge, and at 1,2,4,6,12, 18,24,30 and 36 months of age; thereafter height and weight should be measured at yearly intervals.

In addition to suggesting ways to obtain the recommended measures accurately, the conference spoke to methods of interpretation. The general idea was to see whether the child is typical in comparison with his peers. The age, sex and genetic potential must be considered in comparing the child's growth with descriptive norms obtained in past studies. No definite criteria have been established for the amount of deviation constituting abnormality. One assumes, however, that the less typical the child is, compared with these norms, the more likely he is to have an unhealthy condition needing further assessment.

There are a variety of normative growth curves available for clinical use. The American Academy of Pediatrics recommended the head circumference standards developed by Nellhaus (1968) and the height and weight standards of Stuart and Meredith (Children's Hospital Medical Center). The latter growth curves cover the ages of birth to 28 months. While probably the best for current use, they have been criticized as current anthropometric norms; they were developed in 1930 to 1946 by Dr. Harold C. Stuart from measurements of white children of North European ancestry living in Boston.

Since both heredity and environmental factors influence growth and development, the progress of any child results from a complex interaction between many different factors. Findings have consistently showed different timing in growth depending on sex of the child; girls mature physically faster than boys. Sex-specific norms must therefore be used in assessing child growth. Racial differences have been found for white children's and black children's body proportions, but the height-weight findings suggest that differences are due to socioeconomic status rather than race.

Children from different socioeconomic levels differ in body size at all ages. The British children in the high socioeconomic class of the professional and managerial classes are taller than the children of unskilled laborers by about 2.5 centimeters (1 inch) at 3 years of age and by about 4.5 centimeters (1½ to 2 inches) at adolescence. Although the reasons for socioeconomic differences in growth are not clear, the recent findings of the Ten-State Nutrition Survey seem applicable. The educational attainment of the person responsible for buying and preparing the family's food was related to the nutritional status of children under 17. That survey also found that biochemical nutritional indicators varied by income; the relationship holds when ethnic background is taken into account.

It is difficult to separate the genetic and environmental factors as they interact to affect growth. There is evidence that the variables relevant to these interactions include the mother's nutriture and diet during pregnancy, family eating patterns, genetic tendencies for body build, psychosocial conflicts, as well as stress, illness, and hormonal activity.

Both for psychological, social, and occasionally practical reasons, it is at times important to be able to predict the eventual adult height anticipated for a child. Sinclair (1969) comments that the predictive value of birth length is nil, because it is considerably influenced by the environment of the fetus in the womb. However, after the child is old enough to express his genetic endowments, i.e., 3 years, height can be predicted quite accurately, as shown in the Aberdeen growth study.

Normal growth and development are only part of the picture of physical health to be considered in a childhood assessment methodology. Other aspects of physical health may alternatively be seen as outcomes in their own right or as predictor or mediating variables for the outcomes previously discussed. We have included them as outcomes in the study of the first year of life in order to make the spectrum of well-being considered as broad as possible.

The nutritional status of the growing child must be considered in any health assessment program. By definition it is interwoven with many other aspects of well being; deficiencies will be reflected in other areas such as illness and growth curves. Useful chemical indicators like the hematocrit and hemoglobin levels have been developed for measurement.

The area of nutrition, moreover, has social as well as biological implications, as the caretaker and child routinely interact in one way or another over this activity repeatedly during the course of the day.

Accidents are the sixth ranking cause of death in infants; between 1 and 4 years of age they are the major cause, accounting for 36 percent of the mortality. Nonfatal accidents, of course, far outnumber accidental deaths. Figures from the National Health Survey show that every year 38 percent of the children under 6 receive injuries which require medical attention or restrict their activity for a day or more. Yet, despite its prevalence, accidental injury is a good example of how little is known about the epidemiology of some of our major health problems which can consume the developmental time and energy of children. But, here again, the studies which have been done indicate that not only child characteristics are contributory (e.g., temper frequency, attention span during play, and amount of spontaneous, general activity), but that the quality of parent-child relationships and other family environmental factors also help to differentiate the accident-prone child.

Wight's study (1969) has resulted in a helpful classification of types of accidents. "Child-active" accidents are those in which the child's activity or movement within the environment trigger the trauma. In "child-passive" accidents the trauma results from the actions of other persons or objects in the environment.

Non-traumatic childhood morbidity is a broad subject with many ramifications for child growth and development. Acute minor illnesses are more frequent in the early formative childhood years than in later life (Schiffer and Hunt, 1963). Carey and Sibinga (1972) have prepared an excellent review of studies regarding the psychological effects of illness and its management on children and their families. For the child the results described included the discomfort of the illness and treatment, such emotional reactions to the illness as guilt, fear, anger; the loss of normal social contacts; the restrictions such as bed rest and diet and the decreased or altered sensory input; and the changed relationship with parents who may respond with indulgence or hostility.

In past studies and periodic health surveys, various classifications have been used for illness, including the extensive International Classification of Diseases. the National Health Interview Survey Coding structure for lay reports, and categories arbitrarily developed to suit the most prevalent illnesses occuring in specific data collection situations. When dealing with very young children, the literature shows consistency in the need for only a few categories of frequently occurring illnesses (e.g., Mindlin, 1970; Dingle, Badger, Jordan, 1964; Spence, Walton, Miller, Court, 1954) unless, of course, one is studying the epidemiology of specific diseases.

The quantification of illness is probably most difficult, in that there seems to be no best source for the information. Through using clinical records one is likely to be measuring health care utilization, as untreated illness will not be included. Through using family reports, one is concerned with the validity of reporting. And if clinical examination is used to verify the family report for research purposes, it becomes very costly.

When considering physical illness there is a need to know not only what type of illness occurs but also its severity or influence. The National Health Service has used disability days in an effort to get at severity (DHEW, PHS, Pub. No. 1000, Series No. 2). However, Schach and Starfield (1973) have demonstrated that "bed days" or "restricted activity," have limited usefulness in defining early childhood disability. The problems in developing any overall index of physical health are considerable (Sullivan, 1966). The advisable tack seems to be to tap several measures of physical health status.

## Implications for Choosing Child Developmental Outcomes

As the review of child developmental outcomes progressed, it became increasingly clear that, even though they are often considered independently within studies, independence does not exist in reality; disability or failure in one area of development has implications for other areas of child function, and optimum function is enhanced by concordant normality across areas. The decision was made to include the broad range of these potential problems in the process of developing screening/assessment formats. This decision was made not only because of the lack of independence of outcomes, but also because there is no evidence to support any order of importance among them.

The review also pointed out that common outcome classifications may be too gross to facilitate a deeper understanding of their etiology; this consideration applies particularly to "mental development" and "social development." Finer subsets of skills and characteristics appear to be more useful, as for example: attention span, rate of habituation, motivation, goal directedness.

The literature also shows that although many childhood dysfunctions do not become evident until a child is of school age, the stage is probably set for their development very early in life. For example, let us look at the Smith, Flick, Feriss and Sellman (1972) study, which to date considers more risk factors in combination than any other. In contrast to data gathered during infancy, data gathered after age one year added little to discriminating between high and low seven-year I.Q.s. This would suggest that infancy is the most opportune time for both the identification and therapeutic treatment of high-risk children. Furthermore, recent cost-benefit analyses indicate that, if EPSDT programs are effective, the greatest cost benefit will accrue from screening during the first year of life (Britt, Dickson, and Bradley, 1974). One of the recurring issues for all types of developmental outcomes, however, was the difference in dimensions expressed before age two or three from those found at later ages. There is a general lack of correlation between the various developmental measures before age two and the developmental status at later ages. This discrepancy means that the development of any preventive assessment format for infancy and early childhood must include tests of predictive validity against outcome measures after age two.

The lack of predictability for developmental tests per se across ages suggests that the factors assessed early must be broadened to include other precursors and correlates of later child status. The research evidence on the antecedents and predictors of developmental outcomes, which might be candidates for enlarging the scope of early assessment techniques, was found to be uneven both in coverage and quality. Usually studies either focus on a single type of development, or are concurrent, or use a restricted range of predictor variables. The literature does, however, provide substantial knowledge about the importance of some factors, such as perinatal complications. It also gives strong indication for the need to include others about which less is known, such as the infant's environment.

## Predictor/Mediating Variables

In matters concerning child development, variables don't sort out neatly into "predictor" and "outcome" categories. Partly this is due to the dynamics of events over time. For example, physical illness may be considered an outcome when it occurs, but may also be a predictor of future developmental conditions. The arbitrary nature of classifications of predictors and outcomes is also due to the fact that both short term and long term aspects of health and development interact in very complex ways complicating the matter of prediction.

At the formulation period of this project longitudinal data were becoming available from the Kauai and the National Collaborative Studies. It appeared that the best early predictors for child development were biological status at birth and the quality of the social environment. Extensive literature documents the influence of physical perinatal risk factors. Similarly, there is a large body of evidence relating socioeconomic variables to developmental status. Clearly, these two sets of variables had to be included in any prediction system. The real challenge was to go beyond: to understand better what it is about the environment that is influential; to gain a clearer picture of how physical, behavioral, and attitudinal characteristics interact in the process of development; to obtain more refined systematic measures of the natural phenomena involved. Only then can the accuracy of prediction be increased and only then can we address more effective patterns of care.

The review of relevant fields showed four major areas which should receive priority in the search for knowledge of the developmental process and for improved assessment methods.

## Infant Characteristics

It is becoming increasingly evident that infant attributes and characteristic behaviors play an important role in, first, the capacity for developmental progress and, second, the ways the environment will respond to promote it. The types of variables of interest in this area include the newborn's maturity, neurological intactness, habituation patterns, activity levels and responsiveness to outside stimuli. As the infant progresses through the first year of life, continued physical examination can document minor physical anomalies for his potential relationship to genetically based behavior patterns. Also of importance, particularly for the effect on environment care routines, is the infant's biological rhythms as reflected in the basic function of sleep.

## The Environment

This variable area encompasses both the animate and inanimate environments of the young child. In summary, the literature indicates that the physical and social aspects of the environment assume critical importance for the infant in the availability as well as the organization of stimuli. Because the developmental process depends upon responsive utilization of these stimuli by the child, infant behavior is also examined in typical social exchanges with the mother. And, because of the importance of the social initiative directed toward the child and the responsiveness of persons to him, maternal behavior is simultaneously examined in the caretaking interactions. The assessment of the environment seems one of the potentially most useful avenues toward a predictive armamentarium.

## Parent Perceptions

Parent's views take a central position in a child assessment schema for several reasons. First, parent behaviors related to child development are motivated through a perceptual filter. Actions or responses in child rearing are in part a result of how the parents view the child and the role of parenthood.

Secondly, parents represent a potentially best reporting system on the progress of their children. It is they who have daily contact and are most familiar with typical characteristics and behavior patterns. Parental concerns and perceptions that something is wrong or unusual can be a valuable source of alert to real problems.

Parent reporting, especially by the mother, assumes a major place in this project as the best source of a wide variety of pertinent information not only about the child but also about such things as caretaking activities, expectations about the future, the amount of helpful support in child care and the perception of mutuality between mother and father. These types of information are viewed as important for better understanding both the perceptual influences on child development as well as the milieu of circumstances in which the child grows.

### Life Change and Social Readjustment

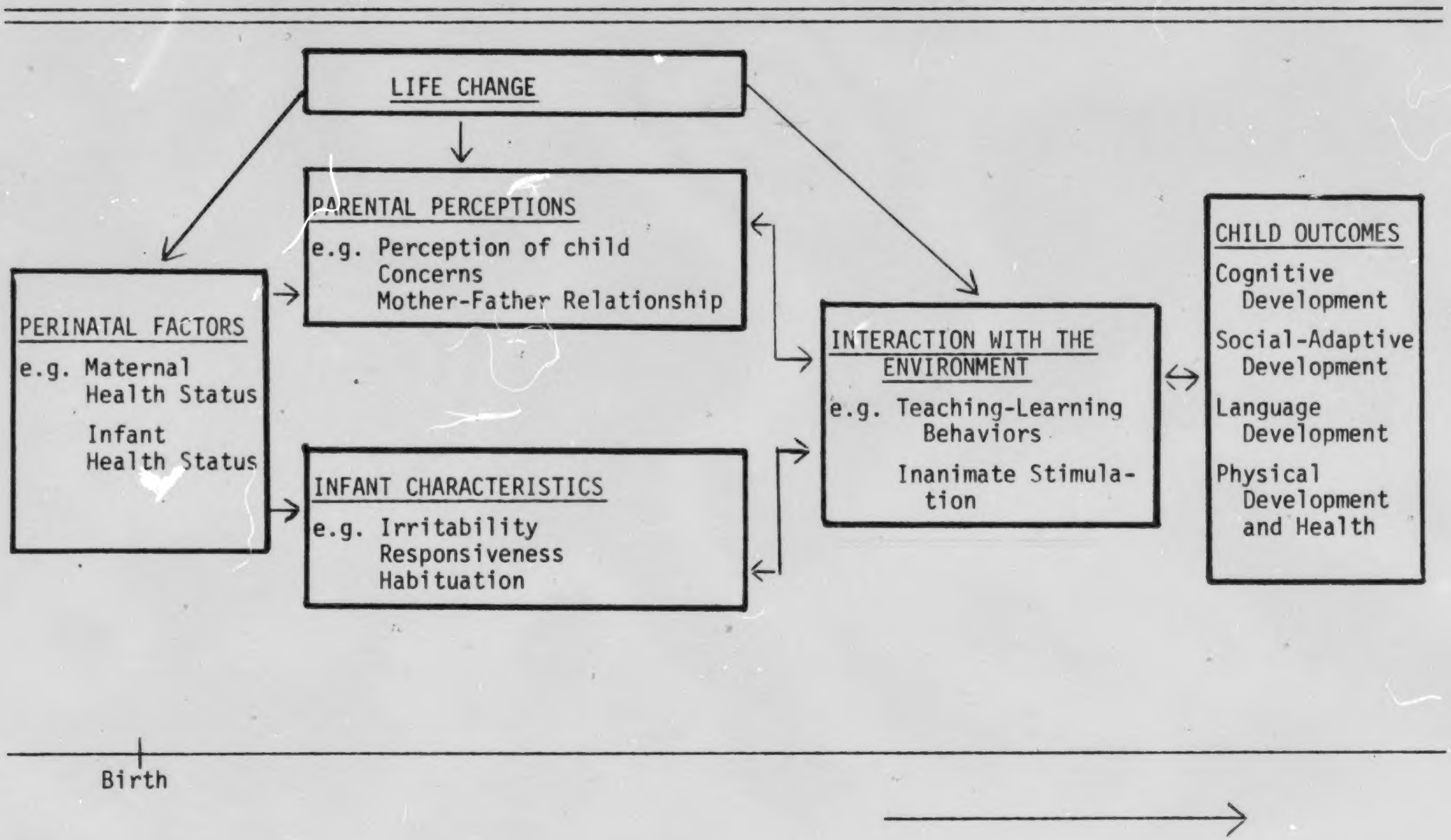
Superimposed on the demands of a new life to nurture are the adjustments required in the course of everyday living. Managing pregnancy, delivery, and subsequent child rearing represents only a portion of the coping energy mothers must draw upon to manage their total life events. Logically, the number of other demands will influence the attention and energy available for mothering. Extensive study has shown that those with a high amount of life change are more likely to experience increased symtomatology, more illnesses and more severe health conditions. Relatively little attention has been given to how demands for social readjustment affects the outcome of pregnancy or child rearing behaviors and attitudes.

If these likely relationships are substantiated, the amount of life change could be a useful assessment predictor.

These four major areas of predictor/mediating variables are explai[illegible] more fully in later chapters of this report along with the empirical evidence for their relevance to child development. Figure 1.3 shows the conceptual framework which resulted from the exploratory phase. Any two-dimensional model over-simplifies the complex interactions at play in the dynamics of child development. The relationships pictured, however, do reflect the general structure which guided our study methods and the analysis. Our findings describe these elements at different times during the first year of life and also show their consistency and change over time.

FIGURE 1.3

THE INTERACTION OF INFLUENCES ON CHILD DEVELOPMENT


LIFE CHANGE
PARENTAL PERCEPTIONS
e.g. Perception of child
Concerns
Mother-Father Relationship
PERINATAL FACTORS
e.g. Maternal Health Status
Infant Health Status
INFANT CHARACTERISTICS
e.g. Irritability
Responsiveness
Habituation
INTERACTION WITH THE ENVIRONMENT
e.g. Teaching-Learning Behaviors
Inanimate Stimulation
CHILD OUTCOMES
Cognitive Development
Social-Adaptive Development
Language Development
Physical Development and Health
Birth

# CHAPTER 2

# METHODS

## Study Aims

Based on the insights of the exploratory phase, a first study trial of the potential screening and assessment methods for young children was planned. The aims of the research were:

1. To determine what early factors are predictive of later child development and health status.

Pursuing this aim was necessitated by the gaps in existing information. Because previous efforts at documenting infant risk factors have tended to focus on a few variables, usually demographic, biological, or those overtly pathological in nature, little is known about additional variability in outcomes produced by other social, environmental, and behavioral variables. In order to find whether the latter hold a feasible potential for adding discriminating power in screening and are potential targets for intervention, they had to be considered simultaneously with the former characteristics. This process leads to an admittedly lengthy list of study variables. But to consider only selected types of variables for their relationship to child development, even in early phases, would be to perpetuate existing gaps in information and lead to inefficiency in discarding early those screening factors which, being redundant, are unprofitable for further attention.

2. To include a broad range of child problems and etiological factors, but focus on those for which assessment methods are most needed.

When considering the most prevalent problems in child health and development, those to which nursing could make the strongest contribution, and those conditions of children and concerns of parents which tend to be neglected currently in the health care system, it became clear that in this project we needed to emphasize child rearing and nurturing as a focus for nurse assessment and intervention. It also became clear that certain health outcomes are routinely identified and handled at the newborn period in existing health care systems by such personnel as pediatricians. Rather than replicating these efforts, nurses and others might more profitably use the information they normally provide. This information could supplement their understanding and identification of children's problems while developing further their role in planning an effective care regimen for the more neglected areas of child care.

3. To determine how the screening/assessment variables can best be measured operationally in a feasible information-gathering process.

The study was planned further to delineate Stages I and II shown in Figure 1.2 (page 1.16). It was the eventual intent to learn a) what identifying risk factors best define the target groups in Stage I which could be done by informally trained personnel, and b) what finer assessments done by nurses in Stage II could lead to their appropriate intervention or referral to "experts" in Stage III. This led to our choosing both a relatively simple method and a more complex one when several methods were available for a particular dimension. These methods were evaluated for their comparative predictive value with the intent of always choosing the method most economical of time and expertise.

4. To determine the stability of high risk characteristics over time.

The literature confirmed the fact that children normally change over time. Part of developing an operational problem-finding process was determining how patterns of change affect the optimum timing for assessment. Little is known about the optimum time(s), especially within the first year of life, at which to assess risk factors to predict future problems. The choice of ages during infancy at which to pretest the instruments was based on a) when new developmental phases have begun and b) when children would normally have contact with the health care system and thus present opportunities for problem identification.

These study aims guided the choice of study design and methods.

## Design

In developing a screening/assessment process to enable preventive intervention, it is necessary to identify those factors associated with poor outcomes before they occur. In order to do this a longitudinal design was necessary. It was also advised as the most efficient preliminary test of the screening methods because it permits examination of variability of the screening measure over time in a cohort of children. Working with children of different ages in a cross sectional design would not permit elimination of any of the screening methods on the basis of lack of predictive validity.

For many reasons it was highly desirable from a developmental and early detection point of view to start the longitudinal study prenatally and to focus on the first year of life. Infancy, a particularly dynamic time of growth and change, is the period when children come under the strongest developmental forces. In aiming at preventive intervention, we should concentrate on this important time of life before behavior patterns become fixed and problems increase in severity. This is also the period when children are usually in contact with the health care system for well-child care, immunizations, etc., and thus the time when other screening and preventive practices could be most easily added to the existing armamentarium.

Table 2.1 shows the ages at which data were collected and the types of contact at each age. Frequent contacts were made prior to one year of age due to the rapidity of developmental changes during this period and the desire to see how early valid predictive assessments could be made. Data collection began during the eighth month of pregnancy. It continued in the hospital after birth, and subsequent contacts were at 1,4,8,12 and 24 months of age in the home or at the Child Development and Mental Retardation Center (CDMRC), University of Washington. The choice of location for data collection at the different ages was based on the place where the subjects and information were at the time, and on where the contact would obtain the most reliable data with the least disruption to the family.

This report includes findings for only the first year of life. Data collection at age two was completed in 1976 through this contract support. Continued funding[1] has been obtained to analyze the data from age two and to continue following the study children through age four because of the importance of future prospective outcomes to meeting the goals of the project.

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[1] Research Grant #NU00559-01, Division of Nursing, Health Resources Administration, Department of Health, Education, and Welfare.

## TABLE 2.1

## AGE OF STUDY CHILDREN AT DATA COLLECTION BY TYPE OF CONTACT AND LOCATION

| Type of Contact | Age at Data Collection | | | | | | |
|---|---|---|---|---|---|---|---|
| | 3rd Trimester | 2 days | 1 mo. | 4 mo. | 8 mo. | 12 mo. | 24 mo. |
| Mother questionnaire | G.H.[1] Clinic | | | | | | CDMRC[2] |
| Father questionnaire | | | | | | mail | |
| Newborn infant exam | | G.H. Hosp. | | | | | |
| Medical record abstract | G.H. | | | | | G.H. | |
| Mother interview | | G.H. Hosp. | Home | Home | Home | Home | |
| Observation of environment | | | Home | Home | Home | Home | |
| Observation of interaction | | | Home | Home | Home | Home | CDMRC |
| Psychometrist developmental testing | | | | | | CDMRC | CDMRC |
| Pediatrician exam | | | | | | G.H. | |

[1] Group Health Cooperative of Puget Sound

[2] Child Development and Mental Retardation Center, University of Washington

## Sample

The need for a longitudinal design and the data required to meet the research aims created challenges in choosing a study population. Obtaining informed voluntary participation necessitated the interest and help of a care system providing antepartum and maternity care. Cooperative collaboration with the care providers was also necessary to collect information about the mother and child through the newborn period to age one year. In order to answer the study questions it was also desirable that the population not be all of the same educational or social background. These requirements were well met when the Group Health Cooperative of Puget Sound agreed to participate and collaborate in the proposed investigation.

The fact that Group Health is a prepaid medical care plan structured as a Health Maintenance Organization with a wide variety of available curative and preventive services was beneficial to the project goals in another respect. Inaccessibility of care, the cost of care, or restrictions of types of care available were potentially confounding variables in a study aimed at improving screening/assessment methods and increasing knowledge about child development. A Group Health study population had access to services which made findings much less vulnerable to interpretations of lack of health care.

The Group Health Cooperative of Puget Sound has a membership of approximately 200,000 individuals from a broad socio-economic range. At the time of sample intake, antepartum supervision was provided by 17 obstetricians. Births at the Group Health Hospital were estimated at 150 per month. Several criteria were applied in selecting the sample:

1. Only primiparous mothers were included. "Primipara" as used here meant a woman anticipating her first experience in raising a child. This restriction was made because of the confounding influence which previous child-rearing experience has on mother-infant interaction and child care patterns. Approximately 75 mothers per month met this criterion.

2. Multiple births, stillborns, and infants with life-threatening congenital anomalies or Down's syndrome were excluded since it is known that these infants represent a special high risk group. Their numbers are small, and there would not be enough of them to lead to specific inferences. Actually, their exclusion decreased the universe only slightly.

3. Level of maternal education was used as a sampling indicator of family social class. In order to insure variability on child-rearing behaviors and outcomes related to education, the plan was to have one-half of the sample comprised of mothers who had no schooling beyond high school.

4. The presence or absence of perinatal risk factors was also used as a sampling variable so that the effect of physiological compromise could be documented empirically in the longitudinal data. The plan was to choose the sample so that one-half of the mother-infant pairs had experienced one or more of the risk factors specified in Appendix 2.1.

Applying the sampling criteria of maternal education and perinatal risk resulted in a four-cell design. The plan was to include 50 families in each sample cell for a total of 200. The projected sample size was based both on feasibility and the requirements of data analysis. As the cohort aged, there were times when as many as 90 of the infants per month required home or hospital data collection. This was the maximum possible with the available staff and funding.

Table 2.2 shows the 193 mother-infant pairs actually admitted to the study by the sampling characteristics; 58.5 percent experienced one or more perinatal risk factors, and 43.5 percent of the mothers had no formal schooling beyond high school. Potential subjects with some college education volunteered more readily. Since mothers with less education seemed more apprehensive about committing themselves to prospective long-term study involvement when the outcome of delivery was still unknown, study personnel began approaching them immediately after delivery. This plan did in fact raise the proportion of mothers with less than college education who agreed to participate longitudinally. For the 39 subjects recruited in this manner, the antepartum data were obtained retrospectively.

For the most part, however, the primiparous patients were first contacted in the prenatal clinic, during their eighth month of pregnancy. The effort was made to contact all primiparas under medical supervision of Group Health. Each morning the appointment records were reviewed and the clinic medical charts of patients meeting our criteria were tagged with a message about the study. The obstetrician's nurse was responsible for handing the patient this message, and without going into detail about the study, suggesting that she stop at the project office at the completion of her appointment. This office, conveniently located in the prenatal clinic, was staffed during the hours when patients had appointments. Twenty-six percent of the patients whose charts were tagged did stop to learn more about the study.

The study staff member explained the study in detail and responded to questions asked. At that contact, some of the women consented to participate and completed the necessary questionnaires. Some consented but

## TABLE 2.2

## NUMBER OF MOTHER-INFANT PAIRS ADMITTED TO STUDY BY SAMPLING VARIABLES

| | Mother's Education | | |
|---|---|---|---|
| Maternal and/ or Infant Perinatal Risk Factors | High (More than High School | Low (High School or less) | Total |
| Absent | 50 | 30 | 80<br>(41.5%) |
| Present | 59 | 54 | 113<br>(58.5%) |
| Total | 109<br>(56.5%) | 84<br>(43.5%) | 193<br>(100%) |

preferred taking the materials home to complete. The rest were given materials to take home for further review; these included the informed consent form, a written explanation of the study, the prenatal questionnaire, and a stamped envelope with the project address. In return for completing the prenatal questionnaire the mothers were sent a copy of Dr. Brazelton's article, "Trial by Motherhood: The First Time Blues." As might be expected, some mothers who consented to participate during their clinic appointment never returned the prenatal questionnaire.

For anyone wishing to replicate this study or to undertake similar longitudinal research on infants, it is important to recognize the effort which must go into obtaining a sample. The groundwork laid in this project included displaying posters about the study throughout the prenatal clinic and publishing an explanation of the study in the official bimonthly magazine of Group Health, announcing its support of this activity. Similarly, to facilitate informed assistance from health personnel within the setting, informational staff meetings were begun six months prior to sample intake. These meetings, held at times convenient to all work shifts, provided the opportunity to obtain the staff's help in planning procedures. All the groundwork efforts proved valuable as the data collection, especially during the delivery hospitalization, depended upon the ongoing help of multiple personnel.

Each morning, the project file of participants was compared with the delivery room log. All primiparas who consented to participate and who delivered single infants free of major congenital defects were contacted by an investigator. The study and its expectations of the mother were again reviewed. Very few of the mothers who had consented and completed the prenatal data changed their minds about participating.

Physical constraints of the hospital nursery limited intake of subjects to three infants a day. The procedure for selection, of accepting all subjects who met our criteria, had to vary if more than three subjects were available. Subjects at those times were selected in an attempt to equalize the existing number in each sample cell. In the interest of maintaining the study schedule so that subsequent activities could be successfully concluded within the given time frame, intake was concluded May, 1974.

On the average, the study mothers had experienced 13.9 years of schooling (SD=2.5, range=8 to 20) (Table 2.3). This result is undoubtedly influenced by the educational sampling criterion. The study fathers averaged 14.9 years of schooling (SD=3.1, range=5 to 29).

The distribution of total family income (Table 2.4) for the year before birth documents the variability of the sample on variables related to social class. While the median income category is $11,000 to $12,000, there are two other modal categories at $2,000 to $3,000 and $15,000 to $20,000.

At the time of delivery mothers were 24.9 years old on the average (SD=4.3, range=16 to 40). The variability on age is probably somewhat decreased by the exclusion of multiparas, but not unduly so (Table 2.5).

The racial distribution of mothers (Table 2.6) reflects the membership of the prepaid medical program to which they subscribe and is typical of Northwestern populations. The number of subjects from other than Caucasian groups is small (N=30) and, as was expected, does not permit control analyses.

### TABLE 2.3

### DISTRIBUTION OF SAMPLE MOTHERS AND FATHERS BY YEARS OF SCHOOLING

| Years of Schooling | Mother | | Father | |
|---|---|---|---|---|
| | N | % | N | % |
| 5 | 0 | 0.0 | 1 | .5 |
| 7 | 0 | 0.0 | 1 | .5 |
| 8 | 1 | .5 | 0 | 0.0 |
| 9 | 2 | 1.0 | 0 | 0.0 |
| 10 | 6 | 3.1 | 2 | 1.0 |
| 11 | 11 | 5.7 | 6 | 3.1 |
| 12 | 62 | 32.1 | 48 | 24.9 |
| [illegible] | 17 | 8.8 | 14 | 7.3 |
| 14 | 14 | 7.3 | 23 | 11.9 |
| 15 | 7 | 3.6 | 4 | 2.1 |
| 16 | 26 | 13.5 | 32 | 16.6 |
| 17 | 32 | 16.6 | 22 | 11.4 |
| 18 | 5 | 2.6 | 14 | 7.3 |
| 19 | 4 | 2.1 | 10 | 5.2 |
| 20 | 3 | 1.6 | 2 | 1.0 |
| 21 | 0 | 0.0 | 4 | 2.1 |
| 22 | 0 | 0.0 | 3 | 1.6 |
| 29 | 0 | 0.0 | 1 | 0.5 |
| Unknown | 3 | 1.6 | 3 | 3.1 |
| | 193 | 100.0 | 193 | 100.0 |

### TABLE 2.4

### DISTRIBUTION OF SAMPLE FAMILIES BY TOTAL INCOME YEAR BEFORE BIRTH

| Income in Dollars | N | % |
|---|---|---|
| 2 - 2999 | 11 | 5.7 |
| 3 - 3999 | 3 | 1.6 |
| 4 - 4999 | 7 | 3.6 |
| 5 - 5999 | 1 | .5 |
| 6 - 6999 | 5 | 2.6 |
| 7 - 7999 | 9 | 4.7 |
| 8 - 8999 | 12 | 6.2 |
| 9 - 9999 | 17 | 8.8 |
| 10 - 10,999 | 21 | 10.9 |
| 11 - 11,999 | 18 | 9.3 |
| 12 - 12,999 | 11 | 5.7 |
| 13 - 13,999 | 10 | 5.2 |
| 14 - 14,999 | 11 | 5.7 |
| 15 - 19,999 | 35 | 18.1 |
| 20 - 29,999 | 9 | 4.7 |
| ≥ 30,000 | 1 | .5 |
| Unknown | 12 | 6.2 |
| Total | 193 | 100.0 |

### TABLE 2.5

### DISTRIBUTION OF SAMPLE MOTHERS BY AGE AT TIME OF DELIVERY

| Age in years | N | % |
|---|---|---|
| 16 | 1 | .5 |
| 17 | 5 | 2.6 |
| 18 | 6 | 3.1 |
| 19 | 12 | 6.2 |
| 20 | 7 | 3.6 |
| 21 | 14 | 7.3 |
| 22 | 16 | 8.3 |
| 23 | 8 | 4.1 |
| 24 | 21 | 10.9 |
| 25 | 10 | 5.2 |
| 26 | 14 | 7.3 |
| 27 | 23 | 11.9 |
| 28 | 16 | 8.3 |
| 29 | 13 | 6.7 |
| 30 | 13 | 6.7 |
| 31 | 4 | 2.1 |
| 32 | 2 | 1.0 |
| 33 | 1 | .5 |
| 34 | 4 | 2.1 |
| 35 | 1 | .5 |
| 40 | 1 | .5 |
| Unknown | 1 | .5 |
| Total | 193 | 100.0 |

### TABLE 2.6

### DISTRIBUTION OF STUDY MOTHERS BY RACE

| Mother's Race | N | % |
|---|---|---|
| Caucasian | 164 | 85.0 |
| Black | 16 | 8.3 |
| Other* | 8 | 4.1 |
| Unknown | 5 | 2.6 |
| Total | 193 | 100.0 |

*Includes Indian, Oriental and Mixed

The parents of 11 percent of the study infants were not living together; unmarried status was given as the major reason. Eighteen percent reported that others besides the nuclear family lived in the household, and in most instances these were one or more adult relatives.

The variability on these demographic variables is gratifying to observe, because it promotes variability on other variables such as parental knowledge, expectations, attitudes, child rearing and other behaviors. At the same time, it is important to recognize the forces leading to homogeneity of the sample in certain respects. These are perhaps best demonstrated by some of the data on health care utilization.

Prenatal utilization of the health care system was exceptionally good. Approximately 92 percent of the mothers began their medical supervision during the first trimester of pregnancy. On the average they made 11.7 prenatal medical contacts (SD=2.6). These figures are influenced by the fact that study intake occurred within the care system and by the unusual accessibility which such a prepaid plan provides. They may also be affected to an unknown degree by underlying characteristics related both to health care utilization and to the willingness to participate in a study of this type.

Even more outstanding is the number of prenatal classes of which these mothers availed themselves; about one-third of the mothers attended nine or more sessions (Table 2.7). This behavior is also probably explained by the availability of services through Group Health and the utilization patterns characteristic of mothers interested enough to volunteer for a long-term study.

The limitations of the sample for analysis and generalizability are fully recognized. Future efforts will need to consider different cultural

## TABLE 2.7

## DISTRIBUTION OF STUDY MOTHERS BY NUMBER OF PRENATAL CLASSES ATTENDED

| Number of Prenatal Classes | Mothers N | Mothers % |
|---|---|---|
| None or Unknown | 30 | 15.5 |
| 1 - 2 | 13 | 6.8 |
| 3 - 4 | 33 | 17.1 |
| 5 - 6 | 31 | 16.0 |
| 7 - 8 | 27 | 14.0 |
| ≥ 9 | 59 | 30.6 |
| Total | 193 | 100.0 |

groups and the children of families who typically underutilize the health care system and who would not participate in lengthy research per se. It must be remembered that the relationships found or not found in this study are a function of the sample composition; other family groups with different risk factors may show different combinations of predictors for screening and assessment. While not being the definitive answer for all populations, however, this first trial of tools and methods will be a large preliminary step facilitating broader related efforts.

## Tools and Measurements

For some of the developmental outcomes (e.g., physical growth) and for some of the predictor variables (e.g., perinatal complications) the status of assessment methods was found to be adequate and applicable to clinical use. For other outcomes and predictors, the existence or applicability of assessment techniques was found to be lacking. This was particularly true for those early childhood, parent, and environmental interaction factors which might be the most helpful in increasing the breadth and predictability of assessment systems. Work to date, however, on observing and quantifying these important dimensions held encouraging promise that, with modification or expansion, practical effective methods could evolve. Many of the techniques developed to date require many hours of observing individuals, counting behaviors, etc. While this is untenable in a routine clinical context, possible simpler versions based on the original conceptualizations could be tested.

For all dimensions of the study we chose the best instrumentation available in terms of known or potential validity, reliability, and training feasibility. This study is an important first test of the instruments devised through this project to assess environmental characteristics such as mother-infant interaction. Some of the items in the maternal interviews were asked in several forms or in an open-ended manner so that classifications could be established and the best method of eliciting answers determined.

The variables and their operational measures chosen for use in the study may be broken down into three types: a) child health and developmental status, b) the known perinatal risk factors, and c) the mediating characteristics of infants, parents, environments, and life change. The variables and sources of data for each set are shown in Appendix 2.2.

The child health and developmental variables were chosen to give the clearest picture possible of the child's status at one year of age. Since these became criterion variables in some of the analyses, more complicated and standardized assessments were used against which to compare the information gathered by the study nurses. These came, for the most part, from sources other than the study nursing assessment staff, such as the medical records, the psychometrist, and the children's regular pediatricians.

The second set of variables, the maternal and infant perinatal risk factors, were obtained by interviewing the mother and abstraction of the medical record. These variables were used to choose the sample to insure adequate representation of those children already known to be at high-risk according to current knowledge. Secondly, those characteristics served as control variables when testing the additional discriminatory power of variables about which the known risk is less precise.

The third set of variables, the mediating parent, infant, environmental, and life change factors represent those data expected to facilitate more precise prediction of infant outcomes and to provide clues for profitable intervention.

The specific instruments are discussed in the relevant chapters along with their findings.

### Data Collection Procedures

The initial contact with subjects has been discussed in the section on the sample. When mothers who had volunteered delivered, project nurses examined the one-day-old infants in the newborn nursery to determine gestational age (Dubowitz Assessment).

The mother was interviewed on her first postpartum day after she had the opportunity to hold and feed her baby at least twice. This contact with the infant was necessary as a base for reporting her perceptions of her baby. (According to hospital procedure, the first postpartum day began at the first midnight after delivery.) The procedure of interviewing varied slightly to meet the needs of the patient and the hospital routines. The hour of the birth, physical condition of the mother, and the infant's feeding time were all factors to be considered. As with each maternal interview throughout the study, all questions were asked and responses were recorded verbatim. The Social Readjustment Rating Scale was handed at each contact to the mother, who checked each item applicable to her.

The circumstances of the Brazelton exam are important as this assessment requires having the infant in a quiet state. The early morning of the baby's second day was selected for the convenience of the hospital staff routine and the availability of a quiet examining room at that time. This time also permitted access to those babies scheduled for circumcision later that morning. In order to avoid bias through the assessor's knowing the baby's and mother's perinatal risk status, a different investigator performed the Brazelton exam on the infant's second day of life at 7:30 a.m. (Infants who were prematures or sick were assessed instead on the day before discharge from the hospital.)

The nursery night nurse prepared the infants for the assessment, having been alerted ahead of time as to which babies would be examined. She would arrange to have the feeding completed by 5:30 a.m. and then seclude the infant in one of two quiet rooms adjacent to the nursery. A total of five investigators were reliability-trained and available on a rotation basis. If there were more than two infants for assessment on any one day, a second investigator assisted at 7:30 a.m. Assessments were performed in the privacy of the small, quiet room, and scoring was completed immediately after each examination.

The study families were visited in their home setting when the babies were 1, 4, 8, and 12 months of age, for the following purposes: 1) to observe the baby in his natural home environment, 2) to observe the interaction between the mother and her baby, and 3) to interview the mother regarding her observations and perceptions of her baby.

The project secretary scheduled the home visits and assigned the home visit investigators so that, as much as possible, they did not visit the same family consecutively; i.e., investigators were not assigned to visit a family they had seen on a previous visit, and investigators who had performed the Brazelton Examination were not assigned to see the same subject at the one month visit. Six members of the staff were trained to be home visit investigators.

Table 2.8 shows the ranges and average ages for the home visits. Ninety-one percent of the home contacts were made within one week of age 1 month: the similar figure for 4 months, 91.5 percent; 8 months, 86.1 percent; 12 months, 77.1 percent.

Each home visitor carried a notebook with the assessment records and observation scales for recording observations in the home. Special cards were printed for some of the scales in the interview for the mother to view and select a response. A toy bag was carried with a tape measure and clear plastic ruler for measuring the infant's physical characteristics, as well as toys for the teaching activities. A teddy bear and cellophane were carried for testing receptive language items from the Sequenced Inventory of Language Development.

The experiences surrounding these home visits have been valuable; they have implications for both health care assessments and similar future research. They point out the advantages of child-parent assessments in the natural home setting as well as the complexities involved.

The appointments for home visits were scheduled at the convenience of the mother, i.e., when she had 1½-2 hours of available free time which was compatible with a feeding time for her baby.

Every attempt was made to be on time for appointments, and, if late, to call and inform the mother. The mothers were asked to phone if they found it necessary to cancel the appointment. Cancellations were usually due to the baby's illness, or occasionally the mother's illness. The

## TABLE 2.8

## AGE OF STUDY CONTACTS PLANNED BY WHEN ACTUALLY MADE

| Type of contact and study age | Percent within specified period of study contact age | | | Range (days) | Median (days) |
|---|---|---|---|---|---|
| | - 1 week to + 1 week | - 2 weeks to + 2 weeks | >2 weeks | | |
| Home visits | | | | | |
| 1 month | 91.0 | 98.4 | 1.6 | -5 to 31 | 1.1 |
| 4 months | 91.5 | 98.3 | 1.7 | -12 to 19 | .1 |
| 8 months | 86.1 | 95.8 | 4.2 | -19 to 23 | .2 |
| 12 months | 77.1 | 85.9 | 14.1 | -22 to 99+ | 1.0 |
| Developmental testing | | | | | |
| 12 months | 34.1 | 62.5 | 37.5 | -43 to 99+ | 10.2 |
| Special Cohort | | | | | |
| 1 month | 46.7 | 86.7 | 13.3 | -2 to 16 | 8.0 |
| 4 months | 67.9 | 89.3 | 10.7 | -3 to 25 | 4.5 |
| 8 months | 57.7 | 84.6 | 15.4 | 0 to 21 | 6.5 |
| 12 months | 46.4 | 60.7 | 39.3 | -8 to 99+ | 8.0 |

majority of the mothers were home and ready for the visit. For those few mothers who were not home, appointments had to be rescheduled. There were a few instances when a home was visited 3-4 times in which no one was home.

The one- and four-month home visits required even more scheduling and coordination than expected. In order to make several of the observational assessments the infant had to be in a particular quiet or alert state. These states, especially during the first month, are highly unpredictable. A time scheduled the prior week, or day, to catch the infant at his best could be completely out of cycle with his behavior on the day of the visit. This resulted in longer visits to wait for the infant's readiness, or in rescheduling the visit for a different hour the morning of the visit. During these early months it was not feasible to schedule the home visitors for more than two visits per day.

We developed guidelines for each age group (1-4-8-12) regarding the sequence of the assessments during the home visit. Consideration was given during pilot testing as to the possible effects of the sequencing on the data. The usual sequence that occurred with most families was as follows:

1. interview with mother
2. observation of mother and baby during feeding
3. observation of mother teaching baby
4. short form of the Sequenced Inventory of Language Development
5. exam of baby for physical characteristics (minor anomalies)
6. Developmental Profile questions for mother
7. Toy Inventory - observation and questions
8. Social Readjustment Rating Scale checklist by mother

9. Caldwell Home Stimulation inventory - observation
10. giving mother forms to update Baby Book and keep a record of Sleep-Activity
11. arranging for appointments for testing at CDMRC.

A rigid sequence of assessments in the home was not possible, however, because of the nature of the observations and the need to be flexible around the baby's requirements. For example, at the one-month visit many babies fell asleep during or after the feeding. Therefore, assessments involving the baby in an awake state had to be done prior to the feeding. If a baby did fall asleep before all assessments were completed, a second visit had to be made at a later date, if convenient with the mother.

The smoothest and most satisfactory sequence occurred by explaining to the mother all of the activities to be done on a particular visit and allowing her to select the sequence based on the needs of her baby. Many times the interview was interrupted so that baby could be fed. Most of the other assessments were brief, so there were few interruptions during a particular activity.

The time requirements for the home visits increased with the age of the infant, largely because of the increases in the baby's activities and the observations the mothers wanted to share with us. In the future, of course, we will know more about the value of the different assessment formats. By deleting those less valid or reliable, we can appropriately shorten the time required at all ages.

A major decision in assessment activities of this type, whether for research or family care, involves the degree of "normalcy" desired during the contact. Since a major purpose of the home visits in this study was to observe the child in his natural environment, we avoided intruding restrictions on normal activities. For example, we did not request that sources of distracting sound be turned down or off. As a result T.V.s, stereos, and radios were sometimes left running (sometime all would be playing at once) to the point that conversation was difficult. It was also distracting when the mother was watching the T.V. or was obviously partially "tuned in" to the program. In the interest of promoting communication during the assessment contact, it seems advisable to compromise the goal of naturalness, at least to cut down on the distractions which are manageable.

In any event, some distractions can be expected about which little can be done. For us these included phone calls (usually from the father), friends dropping in, inquiries from other family members living in the home, and pets; all were curious about the investigators and many times were demanding of attention from the mother. Families who lived under a flight pattern near the Sea-Tac Airport had very high noise levels in their homes. During those visits the investigators had to fit their conversation and interviewing around the lull between airplane departures and arrivals.

In order to keep tabs on some of the distracting influences (which could affect the quality of the home data) the home visitors were asked to record their impressions following the visit. These impressions included distractions during the visit, whether the mother seemed uncomfortable or wanted to terminate the visit early, and whether the visitor was comfortable during the visit. These impressionistic data are further discussed in Chapter 5.

It was also anticipated that these personal contacts might bring to light information which was not captured by the assessment instrumentation. To check this and to take advantage of the professional impressions of the home visitors, we asked them to record the extent to which the formal data reflected the true situation, concerns that were evident on the part of the family but went unregistered, their own appraisal of the strengths and problems in the home, and their concerns about the children.

The information from the mother and the observations of the home environment were a critical part of the study both for gaining new knowledge and for methodological development. Since multiple interviewers were involved, and because the home visits were made over a period of 24 months, it was important to document intervisitor reliability over time. Visits by two staff were made throughout the study on approximately 20 percent of the home contacts. The reliability findings specific to the different assessment methods are reported in relevant later chapters.

On the 12-month home visits all the mothers were asked to bring their infants to CDMRC for the developmental testing by a psychometrist. They were given an appointment convenient to them, usually for the following week, and a permit to park at the University.

The testing was done in a quiet room at CDMRC with as little distracting interference as possible. The total length of the session averaged 1½ hours. Usually the Bayley Scales were administered first, the Sequenced Inventory of Language Development second, and the Uzgiris-Hunt Scales last. This amount of testing was about all that could be managed for 1-year-olds. Their attention span typically decreased over the session; only one child, however, had to be scheduled for retesting due to mood state or fatigue.

For some subjects (N=6) it was necessary to do the 12-month testing in the home. The psychometrist took the necessary equipment into the home setting for those families who had moved from Seattle to another location in the state and for those who were willing to have the testing done but were not willing to come to CDMRC. It is the psychometrist's opinion that the change of protocol to testing in the home in these instances did not generally influence the results; this is in contrast to the experience in the home testing of 2-year-olds, who are more mobile and distractable.

The psychometrist was left with the impression following the 1-year testing that this is an age when mothers are anxious about how their children are doing in comparison with their peers. Such anxiety seems to decrease by age 2, when mothers are more relaxed about child performance. Mothers often asked questions about the test results of the psychometrist, who would then use specific items to show them that the child's performance was in the normal range for age. She did not discuss the test findings *per se* with the mothers. For those few children having results which might indicate a developmental problem rather than the typical resolving fluctuation around norms at 12 months, the usual protocol was followed to insure the necessary attention of the health care system.

Table 2.8 shows that 62.5 percent of the children were seen within two weeks of age 1 year for their developmental testing. The range in age for this contact was wider because of scheduling contingencies for the mothers and the extra effort involved in leaving the home to make contact.

Abstraction of Group Health medical records was a valuable source of information in this study. Records were reviewed twice: at the postpartum period and after the 12-month data collection contacts. Several purposes were served by the record data. Assignment to the appropriate sample cell could be made based on the postpartum review of the mother's and baby's records. The review of the infant's record one year later showed the amount of utilization of the care system and the reason for each contact. Both reviews produced data relevant to predicting child health and development. Supplementary access as needed served an important additional purpose. Care and intervention were not part of project activities. The staff who made periodic assessments, however, were in a position to become aware of a detrimental condition threatening the growth and development of a study child. The ethical obligation in these instances could be fulfilled by checking to see whether the family was already under care for the problem. If not, their primary care person at Group Health could be contacted with the parents' permission.

Information obtained from the prenatal records comprised mother's name, age, race, Group Health number, date of first clinic visit, number of prenatal clinic visits, and significant history, including EDC, number of pregnancies, deliveries, abortions, and stillbirths. Data collected from the labor and delivery chart were: total weight gain, time and date membranes ruptured, type of labor, length of first and second stage of labor, type and time of anesthesia administered, and total medication received. The newborn factors recorded included: sex, birthdate, hour of birth, apparent race, birthweight, length, OFC, gestational age in weeks, type of delivery, presentation, placental vessels, and Apgar at 1 and 5 minutes.

The postpartum record review was done primarily by two persons. One of them was also responsible for the Bayley Testing, but she did not test any children until several months had passed since contact with their records.

Review of the children's records after they had been tested for the 12-month developmental outcomes was done by the same personnel. Information abstracted for clinic contacts during the first year of life included date, age, physician or other personnel seen, height, weight, OFC, hematocrit, professional concerns, and mother's concerns.

The time required to review records ranged from five to sixty minutes depending on the amount of material. The average time required was approximately ten minutes.

A random sample of 20 medical records was pulled and re-abstracted by a project member not previously involved. In no instances were there discrepancies from the original abstracted material which would result in different study classifications.

### Data Collection Personnel

Seven people collected data in this study. All are female Caucasians. Four are nurses; of the others, three have Master's degrees and one has a B.S. degree. The nurses made the majority of home contacts; some visits, however, were made by two other staff members, one with a Ph.D. in Speech and Hearing Sciences and the other with two years of community college. One staff member has a B.S. in Psychology and has been responsible for the data collection at CDMRC, particularly the developmental testing.

The data collection personnel were chosen for their expertise and for their ability to relate to the study families and the personnel from other agencies involved in the project. The four nurses made the majority of data collection contacts in the hospital and in the home. This seemed desirable because the methods being developed were aimed at later nurse utilization in care settings.

Prior to beginning the formal study, in order to prepare for using the potential screening and assessment methods, contacts were made with the Health Department to elicit referral of normal children and children with problems. Pairs of staff then visited the 28 families who were referred so that interobserver reliability as well as feasibility of the methods could be examined. This pretest population was also brought to the University for extensive examination by a pediatrician, a speech specialist, and a psychologist as an aid in validating the findings of the staff from the home visits. Videotapes were also made for use as extended training resources. Special training and reliability sessions were held on the assessment methods for newborns, using nonstudy infants at University and Group Health Hospitals. These prestudy procedures assured high interobserver reliability prior to embarking on data collection.

Appendix 2.3 shows the type of study contacts made by the project personnel. Every method possible, given the available resources, was used to avoid observer bias. In general, except when scheduling did not permit it, assignment was randomly made for home visits. This resulted in a desirable approximation of the real world. Although continuity of family contact is a goal in care settings, in reality factors such as staff turnover necessitate assessment procedures useful to personnel new to a family situation. We needed to find out whether a stranger to the family could effectively establish the rapport necessary to obtain information. Because the assessments are systematic, in a typical health care setting they could be passed on to different personnel with a commonality of meaning.

While the evaluation on the criterion measures at 12 months was not "blind," there is no evidence that the involvement of the psychometrist in earlier study contacts biased her testing. In fact, there is evidence to the contrary; comparison of the 12-month Bayley scores on special cohort children (explained in next section) with those for the rest of the sample showed that earlier continued contact with the former group did not result in their having higher or lower scores than the other study infants.

## Special Cohort

Additional procedures were necessitated by the use of a small special cohort to strengthen the methodological aspects of the study. The plan was to establish a group of 40 mother-infant pairs, representative of the sample cells, who would come to the University for supplemental observation and testing at each data-collection age. There were several purposes for this dual data collection. It provided opportunities to compare the simpler assessments in the home with more complex versions, to acquire a videotape record of the mother-infant interactions, and to tap test-retest reliability.

At the end of the one-month home visit, every fifth mother was asked whether she was willing to be part of this special group. An explanation was given that commitment was needed for the full sequence of contacts through 12 months of age and that each session at the University would require about two hours, during which additional testing and videotaping would be done.

The majority of mothers asked were willing to participate. Many wanted to talk it over with their husbands before deciding. The mothers who refused usually did so because of other responsibilities, i.e., school, or returning to work. If the family chose not to participate, the next subject in their cell was approached until an affirmative reply was received. A map, parking permit, and clinic appointment date for the following week were left with each mother who appeared positive about participating. Once families became part of the special cohort, their participation was continued through similar appointment making on the home visit. At all ages the appointment was within one or two weeks following the home contact.

A total of 33 families were recruited to the special cohort. The CDMRC setting to which they came was a single room with a table, an infant seat, a highchair and a selection of adult chairs. The room was also equipped with a microphone and bright lights so that videotaping could be done through a one-way mirror.

Appendix 2.4 shows the types of data collected from this group. No routine order of procedures could be replicated; the order was determined on an individual basis depending on such factors as the infant's fatigue, cooperation, or hunger.

Referring to Table 2.8 for the age ranges when contacts were actually made for the special cohort, we find that the influences of scheduling and travel to the University are again evident. The percent seen within two weeks of the study age ranged from 86.7 at 1 month to 60.7 at 12 months. Complete special cohort data were obtained for all but two families.

## Prospective Participation and Follow-up

It has been gratifying to note the cooperation of the study families and the interest they have in finding out more about the health and development of their infants. This has implications not only for the success of the present study; it also bodes well for the future feasibility of implementing selective assessment modalities with the expectation of consumer cooperation. On the whole, information which might ordinarily be considered sensitive has been given freely, and mothers have exhibited an even greater than anticipated willingness to share their circumstances, experiences, expectations, feelings, and problems.

As is typical of longitudinal investigations, this study has experienced loss of subject families over time for various reasons. For those who have been unable to continue, every effort has been made to determine the cause of termination and, if possible, to make special arrangements so that participation could be maintained. This has involved telephone calls, special trips to the home, and letters to find a mother who moved without a forwarding address or for some reason was never at home for an appointment. Table 2.9 shows the timing and reasons for subject loss in spite of all the efforts at maintaining prospective participation.

The major reason for total loss of the family or for loss of some data time points has been residential mobility. Most of the moves were related to the father's work, education, or military service. There has been a variety of reasons for the loss of the remainder of the families. Considering the time commitment required of the mother to participate, it is noteworthy that there has been very little dropout through lack of interest or outright refusal. One father asked that his family be withdrawn from the study. One mother asked to be dropped for "personal reasons." The other nonparticipation is due to extenuating circumstances; for example, two mothers who returned to work did not have time to devote to the home visits; one baby was placed for adoption.

## TABLE 2.9

## TIMING AND REASONS FOR LOSS OF SUBJECT POPULATION

| | Time of Data Collection | | | | |
|---|---|---|---|---|---|
| | Newborn | 1 Month | 4 Months | 8 Months | 12 Months |
| | 193 | 189 completed | 178 completed | 170 completed | 177 completed |
| | | 3 unable to locate<br>1 father refused | 1 adopted<br>1 mother working<br>1 personal reasons<br>1 to Chicago<br>7 unable to locate | 1 mother working<br>1 to Colorado<br>6 unable to locate | 4 unable to locate |
| Returned to study at 12 months | | 1 | 6 | 4 | |
| Completion Rate | 100% | 98% | 92% | 88% | 92% |

7 new subjects added,
12 month N=184

It was important to know whether a selective dropout would influence the findings, especially for 12-month status. Every effort was made to locate missing families, and our persistence paid off with successful 12-month contact with eleven previously lost families. The percent contact varies at the different study ages. At one year of age 92 percent (N=177) of the original newborn sample was included.

Of the 16 families lost during the study, 13 had mothers with no education beyond high school. This loss led to the decision to add subjects who had volunteered and provided antepartum data but had not been taken into the sample previously. Seven of these mothers with a high school or lower education agreed to participate when contacted at their child's first birthday. These subjects will be included at subsequent study ages with long-term follow-up being the major goal.

All the newborn and home contacts were successfully completed for 166 (86%) of the mother-infant pairs. Of these, 161 (83%) also had the 12-month developmental testing.

## Analysis

In the process of analysis, we followed this series of steps:

1. Frequency distributions and summary statistics were produced for each item or instrument score. This step provided a first level description of the findings and the presence or lack of variability.

2. Conceptual groupings of the data elements were made. This step arranged the variables from several instrument sources and different ages into homogenous subsets to facilitate analytic handling and interpretation. The study rationale and previous knowledge in the field guided this process.

3. Data reduction was carried out. Those items with lack of variability or minimal usefulness were dropped from further analytic consideration. Items within assessment instruments were examined for their compatibility in scoring across items. Compatible items were combined to produce a more stable reflection of the dimensions being assessed.

4. Reliability analyses were done to look at inter-observer, test-retest, and behavioral task stability using intra-class correlations. This analytic method is described in Appendix 4.6.

5. Appropriate bivariate techniques were used to relate the reduced variables within conceptual areas. This step produced comparisons between simple and complex measures, between parental report and objective assessment, and between similar measures to show consistency over time. The statistical method used to make these comparisons is the Kendall rank order correlation coefficient. This nonparametric method, which makes no assumptions about the distribution of the data, is suitable for ordinal variables. While the Kendall coefficient tends to be lower than other correlation coefficients calculated on the same data (i.e., Spearman and Pearson), it has equal power. The Kendall correlation method was chosen primarily because it is more meaningful with a large number of ties in a small number of categories than are other nonparametric correlations (Nie *et al*, 1975; Siegel, 1956).

Most readers are probably more familiar with the meaning of the magnitude of Pearson correlations than they are with Kendall taus. To demonstrate the differences both statistics were run using the same data to provide comparisons:

| Tau | Pearson |
|---|---|
| .09 | .10 |
| .13 | .19 |
| .20 | .23 |
| .27 | .38 |
| .33 | .42 |
| .53 | .71 |
| .59 | .76 |

A certain proportion of calculated correlations can be statistically significant on the basis of chance alone. This is a concern, especially when large numbers of correlations are produced. To assist the reader in assessing whether this phenomenon is at work or whether something more substantial is reflected in the number of significant correlations, we have added the following to the more complex tables:

A = Total number of correlations computed

E = Expected number of correlations with $p \leq .05$ under the null hypothesis of no association (E = .05A)

O = Actual number of correlations with $p < .05$

6. Variables across conceptual areas were related to produce descriptions of infants and their environments at points in time during the first year of life. The basic method used here is discriminant analysis. The functions derived in discriminant analysis maximize differences between groups of subjects on the variables entered as potential discriminators. The weighting coefficients identify the variables which contribute most to differentiating among the groups on each dimension (function). This method of analysis provides a means of describing groups of mothers at the various time points by grouping the variables into one or more dimensions which reflect the primary characteristics at each time point, and by weighting

the variables so we can see the major descriptors (Nie et al., 1975).[1] The statistical criterion level of $p < .05$ was set throughout the analyses irrespective of the test technique used.

The analyses reported here do not exhaust the potential insights from this extensive study of the first year of life. The data remain a rich resource for future analysis, and we have included some indications for subsequent avenues of inquiry which we think are important to pursue.

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[1] Appendix 2.5 contains a more detailed discussion of discriminant function procedures.

## Appendix 2.1

UNIVERSITY OF WASHINGTON
School of Nursing

Nursing Child Assessment Project

### COMPLICATIONS

Mothers and/or infants with any of the factors listed below will be considered as a complication subject. Mothers and infants without any of the listed problems will be classified as non-complication. The information necessary for making this decision is available on the hospital chart.

#### Maternal

1. Under 20 years of age or over 30 years.
2. Previous history of prematurity (weight below 5#8oz), stillbirth, or neonatal death
3. History of infertility for a 2 year period, for which medical treatment was received.
4. History of a psychiatric disturbance requiring hospitalization or long-term medication prescribed by a psychiatrist.
5. Total weight gain of 10 lbs. or under, or 40 pounds or over, during this pregnancy.
6. Drug addiction
7. No prenatal care, or beginning prenatal care after 7th month.
8. Diabetes Mellitus under treatment
9. Chronic alcoholism
10. Chronic hypo-or hyperthyroidism under treatment.
11. Chronic urinary infection requiring daily medication.
12. Seizure disorder requiring daily medication
13. Hepatitis
14. Vaginal bleeding for which doctor's care was obtained during this pregnancy
15. Toxemia
16. Premature rupture of membranes of 24 hours or greater
17. Puerperal infection, fever during labor requiring treatment
18. Placenta previa, abruptio placenta, cord prolapse
19. Primary C Section for any obstetrical emergency
20. Second stage of labor 2 hours or more

#### Infant

1. Fetal heart tones below 120 or above 160, beats per minute
2. Meconium staining
3. Presentation other than vertex
4. Infant's requiring resuscitation for over 2½ minutes (Hope bag, intubation)
5. Apgar of 6 or below at one minute or five minutes
6. Drug-depressed infant requiring treatment
7. Prematurity - weight of below 2500 gms
8. Postmaturity 42+ weeks of gestation or signs of postmaturity
9. Dysmaturity - low birth weight for gestational age

## Appendix 2.1 (continued)

### Infant (Continued)

10. Two vessel cord
11. Hypoglycemia requiring treatment
12. Oxygen of over 40% for 24 hours or more
13. Seizures
14. Recognizable viral, bacterial, protozoan or fungal infection within first 3 days of life
15. Metabolic disease other than hypoglycemia
16. Bilirubin of sufficient level to result in an exchange transfusion

### MATERNAL EDUCATION

Half of the subjects selected will be mothers with 12 or fewer years of education and half with 13 years or more. Educational level is asked on the prenatal questionnaire.

## APPENDIX 2.2

## VARIABLES AND SOURCES OF DATA

| VARIABLE | SOURCE OF DATA* |
|---|---|
| CHILD HEALTH AND DEVELOPMENT STATUS | |
| I. Mental and Motor Development | Bayley Mental & Motor Scales (12, 24) and Uzgiris-Hunt Developmental Scale by Psychologist (12) |
| II. Social-Adaptive Development | Bayley Behavior Scale by Psychologist (12,24) |
| III. Language Development | Sequenced Inventory of Language Development (SILD) by Speech and Hearing Therapist (12) |
| IV. Child's Physical Health | |
| A. Physiological and structural intactness | Physician's exam (12) |
| B. Growth: height, weight occipital frontal circumference | Medical record (12), mother's report (24) |
| C. Nutrition: hematocrit | Medical record (12) |
| D. Accidents: number during first year | Mother's report (4, 8, 12, 24) |
| E. Morbidity: number and severity of illnesses during first year | Mother's report (4, 8, 12, 24) medical record (12) |
| F. Health care utilization | Medical record (12) |
| PERINATAL RISK FACTORS | |
| As listed in Appendix 2.1 | Medical record (2 days) mother's report (AP) |
| MEDIATING FACTORS | |
| I. Infant Characteristics | |
| A. Physical characteristics | Brazelton Neonatal Behavioral Assessment Scale (2 days)<br>Dubowitz Gestational Age Assessment (2 days)<br>Minor Congenital Anomalies (after Waldrop) (1-12) |

* Numbers in parentheses indicate age of data collection.

Appendix 2.2 (continued)

| Variable | Source of Data |
|---|---|
| MEDIATING FACTORS - Infant Characteristics | |
| B. Rhythmicity of sleep-wake behavior | One-week Record of Sleep-wake Behavior (1-12) |
| II. Family Characteristics | Mother's report (NB-24) |
| A. Demographic - parents' age, race, employment, education and income | |
| B. Physical environment, place of residence and type of housing | |
| III. Parent Perceptions | |
| A. Maternal | Mother's report (AP-24) |
| 1. Social environment | |
| a. Cultural characteristics | |
| b. Husband-wife relationship | |
| c. Emotional support of mother | |
| d. Physical help for mother | |
| e. Joint decision making | |
| 2. Own health | |
| 3. Health of family members | |
| 4. Feelings about pregnancy, labor and delivery, and motherhood | |
| 5. Primary concerns | |
| 6. Attitudes about childrearing | |
| 7. Expectations of child | |
| 8. Understanding of motor and mental development | Alpern & Boll Developmental Profile (8-12) |
| 9. Perception of infant behavior | Broussard Neonatal Perception Inventory (2 days, 1) |
| 10. Temperament characteristics, own and child's | Carey Infant Temperament Characteristics (1-12) |
| B. Paternal | Father questionnaire (12) |
| 1. Feelings about infant | |
| 2. Participation in child care | |
| 3. Concerns about child | |

Appendix 2.2 (continued)

| Variable | Source of Data |
|---|---|
| MEDIATING FACTORS - Parent Perceptions | |
| B. Paternal | |
| 4. Perception of development progress | |
| 5. Perception of infant behavior | |
| 6. Agreement with mother on child rearing | |
| 7. Satisfaction with father role | |
| 8. Educational expectations for child | |
| IV. Parent-Child Interaction and Environmental Stimulation | Caldwell Home Inventory (4,8,12,24) Rating Scales of Maternal & Infant Behavior During Feeding Session (1-12) and Rating Scales of Maternal & Infant Behavior During Teaching Session (1-24) Mother's Report on Interview Items (1-12) |
| A. Animate | |
| 1. Maternal involvement with child | |
| 2. Emotional responsivity | |
| 3. Verbal and nonverbal feedback behavior of mother | |
| 4. Sensitivity of mother to needs and rhythms of child | |
| 5. Contingency of maternal responsiveness | |
| 6. Maternal efficiency | |
| 7. Maternal adaptability | |
| 8. Maternal control strategies | |
| B. Inanimate | |
| 1. Maternal organization of physical environment | |
| 2. Of temporal environment | |

## Appendix 2.2 (continued)

| Variable | Source of Data |
|---|---|
| MEDIATING FACTORS - Parent-Child Interaction and Environmental Stimulation | |
| B. Inanimate | |
| 3. Provision of toys and activities for child | |
| 4. Appropriate level | |
| 5. Variety | |
| 6. Number | |
| 7. Noise level | Interviewer Rating (NB-12) |
| C. Child's response | |
| 1. Attentiveness | |
| 2. Verbalization | |
| 3. Mood | |
| 4. Visual contact | |
| 5. Pleasure | |
| 6. Responsiveness | |
| 7. Intensity of involvement | |
| 8. Duration of involvement | |
| V. Life Change | |
| Recent life events | Holmes' Social Readjustment Rating Scale (AP-12) |

## APPENDIX 2.3

## TYPE OF STUDY CONTACTS MADE BY PROJECT PERSONNEL

| Study Contact | Staff Member A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| Prenatal | | | | | | | |
| Recruitment | | X | (X) | | | | |
| Newborn | | | | | | | |
| Interview | X | X | X | X | | | |
| M & I Risk Factors | (X) | X | (X) | (X) | | | |
| Cell assignment | (X) | X | (X) | (X) | | | |
| Brazelton | X | (X) | X | X | | | |
| Dubowitz | (X) | X | (X) | (X) | | | |
| One Month | | | | | | | |
| Home visit | X | | X | X | X | X | X |
| Special cohort | | X | | | | X | |
| 4 Month | | | | | | | |
| Home visit | X | | X | X | X | X | X |
| Special cohort | | X | | | | (X) | |
| 8 Month | | | | | | | |
| Home visit | X | | X | X | X | X | X |
| Special cohort | | X | | | | | |
| 12 Month | | | | | | | |
| Home visit | X | | X | X | X | X | X |
| Special cohort | | X | | | | | |
| Developmental testing | | X | | | | | |

(X)=occasionally

# APPENDIX 2.4

## MEASURES OBTAINED ON THE SPECIAL COHORT BY AGE

| Measure | Months of Age<br>1 | 4 | 8 | 12 |
|---|---|---|---|---|
| Feeding Observation (videotaped) | X | X | X | X |
| Teaching Observation (videotaped) | X | X | X | X |
| Mother's Perception of Communication | X | X | X | X |
| Carey Survey of Temperament (long form) | X | X | X | X |
| Minor Anomalies | X | X | X | X |
| Bayley Scales |  | X | X | X |
| Sequenced Inventory of Language Development (long form) |  | X | X | X |

## APPENDIX 2.5

## DISCRIMINANT FUNCTION ANALYSIS PROCEDURES[1]

For the discriminant function analyses used in this report we have chosen a stepwise selection method in which the independent variables are selected for entry into the analysis on the basis of their discriminating power. The Wilks' lambda criterion is used which selects the variable which yields the smallest Wilks' lambda (equivalent to the largest overall multivariable *F*) at each step in the analysis. The "F to enter" is set at a level such that no variable would be entered if it decreased the overall power to discriminate among the groups.

The main points of interest in the summary tables are summarized as follows:

1. The variables which emerged in a solution are the major discriminators of the groups. Variables which were considered are listed under "means"; those which did not emerge in the final solution *decreased* the overall discriminating power and were deleted.

2. The canonical correlation is one measure of the importance of a discriminant function. This correlation squared is the proportion of variance in the discriminant function explained by the groups. One criterion for eliminating functions is to test for the statistical significance of discriminating information not already accounted for by earlier functions. Wilks' lambda is an inverse measure of the discriminating power in the original variables which has not yet been removed by the functions--the larger the lambda, the less information remaining. Lambda is transformed into a Chi-square statistic for a test of statistical significance. This criterion is used to determine the significance of the functions.

3. Each standardized discriminant function represents the relative contribution of coefficient of its associated variable to that function. Standardized, rather than unstandardized, coefficients are more relevant since the scales on which the variables were originally obtained are considerably different.

4. The centroids of the group means in reduced space are the mean discriminant scores for the groups on each function. The centroids summarize the group locations in the (reduced) space defined by the discriminant functions.

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[1] For further discussion of discriminant function analysis the reader is referred to Nie *et al*. (1975).

# CHAPTER 3

# INSTRUMENTATION AND FINDINGS: INFANT CHARACTERISTICS

## INTRODUCTION

This chapter on infant characteristics includes presentation of the data on perinatal risk, gestational age assessment, newborn behavioral assessment, newborn neurological assessment, assessment of minor physical anomalies at 4 and 8 months, and the sleep-activity record at 1, 4, 8, and 12 months of age.[1]

The statistics used generally will be mean, standard deviation or median, and range. The Kendall Correlation Coefficient was the parametric statistical procedure primarily used to examine relationships. The number of subjects will be given on each summary table; on tables representing correlations at various age points, the range of subjects included at all ages rather than at each age will be given.

## PERINATAL RISK

### Overview

Maternal and infant perinatal risk factors in relation to child development have received considerable attention and research. Many of the studies, however, have inconsistent findings.

There is evidence that points to the vulnerability of the fetus in unfavorable intrauterine environment. Yet it is difficult to sum up the total effects of these perinatal insults. Radical changes in health care services may call for re-evaluating the results of many of the earlier studies of the consequences of maternal infant risk factors. With known risk factors under continuous medical monitoring and with improved services to minority groups and to the poor, data continue to indicate that race, socioeconomic status, and pregnancy complications may be related. Difficulties arise, however, in demonstrating that the outcome is related to one and not confounded by all.

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[1] A consistent pattern will be followed in reporting the data.

Most research has been directed toward the effects of particular illnesses or conditions rather than towards an interaction of multiple impairments. These multiple impairments include not only the severity of the pregnancy or delivery "illness," its effect on the developing fetus or newborn, the tolerance level of the individual pregnant women and the quality and timing of medical care, but the socioeconomic status of the environment.

Adverse conditions seem to concentrate themselves in the socially-deprived groups. Thus, social and biological variables seem to go hand in hand in predicting pregnancy outcome and the subsequent development of the infant.

Drillien's (1964) research on prematures showed that 20 percent of those with a birthweight of three pounds or less required special schooling or institutionalization. But such a poor outcome was much more common if the infant was reared in poverty than if the child was reared in an environment of plenty. The Pasamanick and Knobloch (1966) retrospective study found that difficulties during pregnancy and at delivery are more highly associated with a lower economic status.

The Kauai Study (Werner, Bierman & French, 1971) indicates that perinatal risk factors disappear during childhood as more potent factors exert their influences. The collaborative study of Niswander and Gordon (1972) investigated the effects of a variety of pregnancy and delivery variables on outcome. This investigation has documented the relationship between the education of the mother and the existence of neurological abnormalities of the infant at 12 months of age. Presumably the lower the mother's education, the lower the socioeconomic status of the family.

A recent review by Sameroff and Chandler (1975), surveying research directed toward early identification of factors predictive of later developmental deviancy, emphasizes the need of a continuous assessment of the transactions between the child and his environment. Obviously, the primary environment to be assessed is the one provided by his caretakers. Sameroff and Chandler felt the characteristics of both the parent and child must be considered as well as the degree to which mutuality and a supportive environment is established.

The results of these research studies indicate that reproductive complications and socioeconomic status are interdependent. When infants with complications are followed over a period of years their development can be anticipated only if environmental factors are taken into consideration. A child who is born vulnerable but has a supportive environment can attain a normal growth process.

Within the last ten years there has been much research on the problem of predicting before birth which pregnancies will result in difficulties. As an example, Nesbitt and Aubry (1969) developed a system of scoring prenatal factors to produce a total predictive score: women with high scores were considered to have high risk of perinatal complications while those with low scores were considered to have low risk. Their scoring tool, the "Maternal Child Health Care Index," includes information about maternal age, race, parity, previous obstetric history, current obstetric disorders, nutrition, disease, emotional status, social class, and home financial situation. Their results provide at least a partial validation of the scoring method, since those mothers rated as high risks did in fact have a higher percentage of complications of various kinds than did those mothers rated as low risks.

Virtually all researchers agree with Nesbitt and Aubry on the predictive factors, although different authors weigh and define the various factors somewhat differently (Haerl, 1974; Hobel, 1973; Goodwin, 19[illegible]; Prechtl, 1967; Werner, Bierman and French, 1971). Maternal age, marital status, race, inadequacy of prenatal care, social class, disease state or malnutrition during pregnancy, prior obstetrical history and maternal stress are cited by virtually all authors.

Description of the Perinatal Risk Measure. The risk factors were taken by a member of the research team directly from the medical chart of the mother and infant. There were periodic reliability checks throughout the selection process, and there was always complete agreement by the two coders.[1]

Distribution of Sample on Perinatal Risk Measures. Table 3.1 shows the frequency distribution of the maternal and infant risk factors. It is well to keep in mind that our primiparous sample was under continuous medical supervision and had registered for care early in their pregnancy.

The three most frequently occurring prenatal risk factors were: age, weight gain, and previous reproductive history of problems.

The four most frequently occurring risk factors during the intrapartum

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[1] The list used as a guide for coding risk has already been discussed in Chapter 2 and is in Appendix 2.1.

## TABLE 3.1

## FREQUENCY DISTRIBUTION OF MATERNAL AND INFANT RISK FACTORS

| | | N=193<br>N | % |
|---|---|---|---|
| | Prenatal Period | | |
| 1. | Under 18 years of age or over 30 years of age | 32 | 16.6 |
| 2. | Previous history of prematurity, stillbirth, neonatal death | 14 | 7.2 |
| 3. | History of infertility for a two-year period, for which medical treatment was received | 0 | 0 |
| 4. | History of a psychiatric disturbance requiring hospitalization or long-term medication prescribed by a psychiatrist | 1 | 0.5 |
| 5. | Total weight gain of 10 pounds or under, or 40 pounds or over, during this pregnancy | 20 | 10.4 |
| 6. | Drug addiction | 0 | 0 |
| 7. | No prenatal care, or beginning prenatal care after 7th month | 0 | 0 |
| 8. | Diabetes Mellitus under treatment | 0 | 0 |
| 9. | Chronic alcoholism | 0 | 0 |
| 10. | Chronic hypo- or hyperthyroidism under treatment | 6 | 3.1 |
| 11. | Chronic urinary infection requiring daily medication | 4 | 2.1 |
| 12. | Seizure disorder requiring daily medication | 0 | 0 |
| 13. | Hepatitis | 0 | 0 |
| 14. | Vaginal bleeding for which doctor's care was obtained during this pregnancy | 0 | 0 |
| | Intrapartum Period | | |
| 1. | Toxemia | 2 | 1.0 |
| 2. | Premature rupture of membranes of 24 hours or greater | 2 | 1.0 |
| 3. | Puerperal infection, fever during labor requiring treatment | 1 | 0.5 |
| 4. | Placenta previa, abruptio placenta, cord prolapse | 1 | 0.5 |
| 5. | Primary C-Section (for any obstetrical emergency) | 11 | 5.7 |

Table 3.1 (continued)

| | | N | % |
|---|---|---|---|
| 6. | Second stage of labor 2 hours or more | 18 | 9.3 |
| 7. | Fetal heart tones below 120 or above 160 beats per minute | 46 | 23.8 |
| 8. | Meconium staining | 24 | 12.4 |
| 9. | Presentation other than vertex | 7 | 3.6 |
| | Neonatal Period | | |
| 1. | Infant's requiring resuscitation for over 2½ minutes | 0 | 0 |
| 2. | Apgar of 6 or below at one minute or five minutes | 23 | 11.9 |
| 3. | Drug-depressed infant requiring treatment | 0 | 0 |
| 4. | Prematurity - weight of below 2500 gms | 3 | 1.5 |
| 5. | Postmaturity 42+ weeks of gestation or signs of postmaturity | 3 | 1.5 |
| 6. | Dysmaturity - low birth weight for gestational age | 9 | 4.7 |
| 7. | Two vessel cord | 0 | 0 |
| 8. | Hypoglycemia requiring treatment | 0 | 0 |
| 9. | Oxygen of over 40% for 24 hours or more | 0 | 0 |
| 10. | Seizures | 2 | 1.0 |
| 11. | Recognizable viral, bacterial, protozoan or fungal infection within first 3 days of life | 0 | 0 |
| 12. | Metabolic disease other than hypoglycemia | 0 | 0 |
| 13. | Bilirubin of sufficient level to result in an exchange transfusion | 0 | 0 |

period were: fetal heart tones below or above normal levels; meconium staining; second stage of labor two hours or more; and primary Cesarean section.

Apgar of 6 or below at one minute or at five minutes, and dysmaturity were the two infant risk factors that occurred most frequently during the neonatal period.

Data Reduction. In analyzing the data we have directed our thinking to two hypotheses: first, Pasamanick and Knobloch's (1961) position that complications and the multiplicity of these during pregnancy and delivery are associated with disorders in childhood. Second, Hobel (1973) suggests that the intrapartum period is a very important determinant of perinatal morbidity and mortality. Therefore, the risk factors were separated according to the pattern of occurrence: during pregnancy, the intrapartum period, and the neonatal hospital stay. The score then represented the cumulative risk to which an infant was subject, or, alternatively, each period could be assessed independently. In the present study scoring was done after all the data had been collected.

Table 3.2 summarizes the distribution of risk factors during the periods of occurrence: prenatal, intrapartum and neonatal. The frequency of risk factors is greater during the intrapartum period, in spite of the fact that there were fewer risk factors on the criterion list during that period (see Table 3.1). This is consistent with recent data presented by Aubrey and Pennington (1973). The most frequent risk factors in this sample population during the intrapartal period were fetal heart tones below or above criterion, meconium staining, and prolonged second stage of labor. These factors all represent probable stress to the fetus.

## TABLE 3.2

## FREQUENCY DISTRIBUTION OF MATERNAL AND INFANT RISK FACTORS ACCORDING TO THE PATTERN OF OCCURRENCE

| Number of Risk Factors | Prenatal Period | | Intrapartum Period | | Neonatal Period | |
|---|---|---|---|---|---|---|
| | N | [illegible] | N | % | N | % |
| 0 | 130 | 67.3 | 114 | 59.1 | 161 | 83.4 |
| 1 | 50 | 25.9 | 51 | 26.4 | 26 | 13.5 |
| 2 | 12 | 6.2 | 23 | 11.9 | 4 | 2.1 |
| 3 | 1 | 0.5 | 4 | 2.1 | 2 | 1.0 |
| 4 | 0 | 0 | 1 | 0.5 | 0 | 0 |
| Total | 193 | 100.0 | 193 | 100.0 | 193 | 100.0 |

The next step in data reduction was to determine a score which represented the duration of risk for the mother and fetus. Table 3.3 presents the ordinal ranking of maternal and infant risk factors. All subsequent references to perinatal risk in this report refer to this ranking. The severe group represents the occurrence of one or more risk factors in all three periods from prenatal through neonatal. The moderate group had risk factors during two periods: always in the neonatal and then one in either prenatal or intrapartum. The mild group had no neonatal risk factor, though it could have had one in the prenatal and/or intrapartum period. This method of data reduction is meant to emphasize the cumulative effect of risk to the fetus rather than an emphasis on the total number of risk factors. This ranking best controls for the mediating influence of medical management, since with appropriate management during the prenatal and intrapartal period the risk to the neonatal should be reduced.

## GESTATIONAL AGE ASSESSMENT

### Overview

Premature infants are known to be at a disadvantage, particularly early in life in their course of growth and development. Recent evidence suggests that infant caring practices are especially important in assisting them to achieve normal health outcomes. Usually gestational age is inferred by birth weight, time since mother's last menses, or a combination of the two. Often gestational age is calculated on misinformation or lack of information about the probable time of conception. Several attempts have been made by neurologists and pediatricians to devise a method for accurately determining gestational age on the basis of overt neurological signs or external physical criteria. Recently Dubowitz, Dubowitz, and Goldberg have made

## TABLE 3.3

## ORDINAL RANKING OF MATERNAL AND INFANT RISK FACTORS

| Category | N | % |
|---|---|---|
| None | 80 | 41.5 |
| Mild[1] | 81 | 42.0 |
| Moderate[2] | 19 | 9.8 |
| Severe[3] | 13 | 6.7 |

[1] Mild = one or more factors in prenatal and/or intrapartum, none in neonatal.

[2] Moderate = one or more factors in neonatal and one or more in either prenatal or intrapartum; or one or more in neonatal and none in prenatal or intrapartum.

[3] Severe = one or more factors in prenatal and intraparium and neonatal.

available such a method which, under trial, correctly calculated gestational age ± two weeks at 95 percent confidence limits.

This tool uses 10 neurologic and 11 external physical criteria to estimate gestational age. The criteria were chosen by the authors as easily defined, reproducible by different observers, and least influenced by neurological abnormality. The criteria scores are used in a regression formula to obtain gestational age. In a study of 167 infants, the estimated age correlated .93 with the age calculated from clear menstrual histories. Multiple assessments were done on 70 infants by the authors: these showed "that the score was not influenced by the state of the baby and that it was as reliable during the first 24 hours as during the subsequent 4 days." (Dubowitz *et al*., 1970, p. 6).

*Data Collection Procedure*. The Dubowitz assessment was done on the infant at one day of age. Interobserver reliability was excellent; prior to beginning data collection staff were trained to the level of 100 percent agreement within one week of estimated gestational age.

*Distribution of Sample Population on Gestational Age Assessment*. Table 3.4 presents the frequency distribution of the sample population. Approximately six percent of the sample (11 infants) were premature using the tradtional definition of < 37 weeks. This is comparable with an approximate seven percent prematurity rate for the Seattle-King County area. It should be noted that the number of infants classified as premature by examination differs from the classification using a weight criteria (see Table 3.1). Using weight there were three infants who were premature and nine infants who were dysmature by definition of weight and gestational age calculated from mother's history. With exception of the risk score data all other references

## TABLE 3.4

## FREQUENCY DISTRIBUTION OF DUBOWITZ GESTATIONAL AGE

| Age in Weeks | N | % |
|---|---|---|
| 33.0 | 1 | .5 |
| 33.5 | 1 | .5 |
| 35.5 | 3 | 1.6 |
| 36.0 | 2 | 1.0 |
| 36.5 | 4 | 2.1 |
| 37.0 | 5 | 2.6 |
| 37.5 | 9 | 4.7 |
| 38.0 | 13 | 6.7 |
| 38.5 | 27 | 14.0 |
| 39.0 | 30 | 15.5 |
| 39.5 | 30 | 15.5 |
| 40.0 | 29 | 15.0 |
| 40.5 | 15 | 7.8 |
| 41.0 | 17 | 8.8 |
| 41.5 | 5 | 2.6 |
| 42.0 | 2 | 1.0 |
| Total | 193 | 100.0 |

Median 39. 3

to premature infants in this study use the classification obtained through the examination procedure. The median gestational age was 39.3.

## NEWBORN BEHAVIORAL ASSESSMENT

### Overview

The Brazelton Scale (1973), originally developed in the 1950s, is receiving increasingly wide use in filling the need for a method of assessing infant behavior in response to environmental stimuli. This scale consists of 27 items measuring the infant's reponses to being handled, specific auditory and visual stimuli, and specific means of stimulus presentation. The examination provides a comprehensive description of the neonate's behavioral capabilities, including behaviors considered to be precursors of later cognitive characteristics. Each of the behavioral variables assessed by this procedure was scored along a nine-point continuum.[1] Built into the procedure for doing the behavioral assessment is a modification of the Prechtl neurological examination.

Brazelton (1973) summarized the published interobserver reliability reports for this scale. They range from .85 to 1.0, and reportedly testers can be trained to a .90 criterion of reliability which is maintained for a "prolonged period" (p. 48).

Test-retest reliability has been done on 60 infants tested at 3 days and at 1 month of age. The mean retest reliability for males was 58 percent agreement within one point on the original nine-point scales and 79 percent within two scale points. For females it was 65 percent and 85 percent respectively (p. 50).

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[1] The version of the scale used here was the mimeographed edition in use in 1972-73, which differs in some ways from the published version.

The Brazelton Scale has been used on a variety of infant populations; many of these studies are not yet reported. Evidence to date does support the scale's ability to differentiate between babies born from high risk and normal pregnancies and also between low and normal birth weight infants.

Many of these studies which have used the Brazelton Neonatal Behavioral Assessment Scale have looked for behavioral differences between groups of infants with differing characteristics such as birth weight (Als, Tronick, and Brazelton, 1975), maternal narcotic addiction (Strauss, 1975), and medication during labor and delivery (Aleksandrowicz and Aleksandrowicz, 1974). The work of the Nursing Child Assessment Project at the University of Washington has been focused, instead, on the use of this neonatal exam as a predictor of later developmental characteristics.

Data Collection. All the Brazelton exams were performed during the second postpartum day,[1] and the majority were done at 7:00 a.m., midway between regular feedings. Although six different examiners were involved in the data collection, three of them accounted for the majority of the cases (150 of 193). During the Nursing Child Assessment Project prestudy training period, all six staff members spent three days with Dr. Brazelton learning to use the scale properly. Following training, staff tested 30 infants in paired observations. Reliability ranged from 85 percent to 100 percent within one scale point. The mean reliability was 92.5 percent.

Distribution of Sample on Newborn Behavioral Assessment and Neurological Examination. Table 3.5 presents the distribution of the 193 subjects assessed

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[1] Preterm infants were examined the day prior to their hospital discharge.

## TABLE 3.5

## DESCRIPTION OF NEWBORN CHARACTERISTICS RELATED TO THE BRAZELTON EXAMINATION

| Variable | Distribution of Population Conditions | |
|---|---|---|
| | Mean | Standard Deviation |
| Birthweight (pounds) | 7.45 | 1.25 (lbs.) |
| Length (inches) | 20.33 | 1.29 (inches) |
| Age of Brazelton Exam. (hours) | 46.2 | 11.67 (hours) |
| Sex | Female 96 | Male 97 |

Type of Feeding

| | |
|---|---|
| Breast | 80 |
| Bottle | 83 |
| Missing | 30 |

| State | Initial State Observed before exam | During Exam Initial State | During Exam Predom. State | Two most Predominant States throughout Exam 1 | Two most Predominant States throughout Exam 2 |
|---|---|---|---|---|---|
| Deep | 19.7 | 2.1 | -- | | |
| Light | 47.7 | 60.6 | -- | 1.0 | |
| Drowsy | 20.7 | 24.4 | 5.2 | 13.5 | .5 |
| Alert | 10.4 | 11.4 | 51.3 | 61.7 | 7.8 |
| Active | 1.0 | 1.0 | 23.8 | 18.1 | 44.0 |
| Crying | .5 | .5 | 17.6 | .5 | 40.4 |
| Missing | | -- | 2.1 | 5.2 | 7.3 |

on these exams with respect to birth weight, length, age in hours, sex, type of feeding, initial state observed before exam, initial state during the examination, the two most frequent states during the entire examination period, and finally the predominant state during the examination. The initial state observed differs from the state on starting the examination, since it was our policy to start the response decrement items in light sleep. Obviously therefore the examiner waited until the infant was in light sleep whenever possible.

Seventy percent of the infants were judged to have as one of their predominant states during the exam alertness, or State 4. Approximately half of the infants (51 percent) had State 4 as the single most predominant state during the examination.

There were approximately 24 infants (13 percent) who were awake or crying at the beginning of the examination and were therefore not tested on the first four response decrement items since it is done in a sleep state. Ideally another exam period should have been arranged for these infants. This was not possible, however, since the majority of infants and mothers were discharged during the second day postpartum. With the exception of the items 1-4, the majority require an alert state; since Table 3.5 demonstrates that 74 percent of the infants were predominantly in an awake, non-crying state it is reasonable to conclude that the examinations were generally conducted in appropriate states.

Table 3.6 presents the scores on all of the behavioral assessment items with the exception of smiling (item 27). There was not enough variability in this item to warrant further analysis. The number of valid observations for each item, as well as the mean, standard deviation, median, and mode,

## TABLE 3.6

## SCORES ON 26 ITEMS OF THE BRAZELTON NEWBORN BEHAVIORAL ASSESSMENT SCALE FOR NURSING CHILD ASSESSMENT PROJECT SAMPLE*

| | Name of Item | Valid Observations | Mode | Median | Mean | S.D. |
|---|---|---|---|---|---|---|
| 1. | Response Decrement to Light | 167 | 7.0 | 6.4 | 6.2 | 2.0 |
| 2. | Response Decrement to Rattle | 160 | 8.0 | 7.7 | 7.1 | 1.9 |
| 3. | Response Decrement to Bell | 152 | 8.0 | 7.3 | 6.9 | 1.8 |
| 4. | Response Decrement to Pinprick | 148 | 3.0 | 3.5 | 3.7 | 2.0 |
| 5. | Orientation Inanimate Visual | 185 | 4.0 | 4.6 | 5.0 | 2.0 |
| 6. | Orientation Inanimate Auditory | 189 | 9.0 | 6.9 | 6.7 | 2.0 |
| 7. | Orientation Animate Visual | 185 | 4.0 | 5.2 | 5.3 | 1.8 |
| 8. | Orientation Animate Auditory | 187 | 9.0 | 7.0 | 6.8 | 1.9 |
| 9. | Orientation Animate Vis & Aud | 185 | 7.0 | 5.8 | 5.7 | 1.9 |
| 10. | Alertness | 187 | 9.0 | 6.0 | 5.8 | 2.4 |
| 11. | General Tonus | 193 | 6.0 | 5.8 | 5.7 | 1.1 |
| 12. | Motor Maturity | 193 | 5.0 | 4.6 | 4.4 | 1.6 |
| 13. | Pull to Sit | 191 | 4.0 | 4.7 | 5.0 | 2.0 |
| 14. | Cuddliness | 191 | 5.0 | 6.1 | 6.2 | 1.8 |
| 15. | Defensive Movements | 190 | 8.0 | 6.9 | 6.5 | 1.7 |
| 16. | Consolability | 180 | 8.0 | 7.8 | 7.1 | 1.7 |
| 17. | Peak of Excitement | 192 | 7.0 | 6.2 | 6.1 | 1.3 |
| 18. | Rapidity of Buildup | 193 | 6.0 | 5.2 | 4.9 | 1.7 |
| 19. | Irritability | 192 | 5.0 | 4.7 | 4.6 | 1.8 |
| 20. | Activity | 193 | 5.0 | 5.0 | 5.0 | 1.2 |
| 21. | Tremulousness | 193 | 6.0 | 5.4 | 4.7 | 2.5 |
| 22. | Startle | 193 | 7.0 | 5.1 | 4.9 | 2.0 |
| 23. | Lability of Skin Color | 193 | 5.0 | 5.3 | 5.2 | 1.3 |
| 24. | Lability of States | 191 | 2.0 | 2.8 | 3.1 | 1.6 |
| 25. | Self Quieting Activity | 190 | 9.0 | 7.4 | 6.5 | 2.5 |
| 26. | Hand Mouth Facility | 192 | 9.0 | 6.1 | 5.7 | 2.7 |

*Total N = 193

comprise the statistics shown. The most incomplete data was for the habituation items (1, 2, 3, 4); as previously stated this occurred when the infant did not have the appropriate state for testing (States 1, 2 or 3).

The data analysis began with an examination of the frequency distributions of each item for all 193 subjects. As originally designed, the nine-point items on the Brazelton exam were expected to have a somewhat normal distribution of scores; that is, most infants should fall in the middle of the items, with scores of 1 and 9 being most deviant and hence most infrequent. In this particular sample, several items did not show this kind of distribution. In fact, only 11 of the 27 items showed a mode on scores 4, 5, or 6. Five items showed their greatest frequency at point 9 on the scale.

Appendix 3.1 gives the frequency distribution for each item. From examining this data it was apparent that the scoring on each item did not represent a normal distribution. In short, the characteristics of the distributions made it clear that traditional statistical procedures performed on these data, such as factor analyses, could be misleading.

### Further Definition of Newborn Behavioral Organization

Thus, the major thrust of the work reported here has been in developing summary scores which meet two criteria. In the first place, the scores must be meaningfully related to other behavioral data about the child. In the second place, the scores must be defined in such a way that they can be used in clinical and service settings by health personnel who are relatively unskilled in statistical and computational procedures.

The intention was to combine items to make summary scores, yet some scores had distinctly different interpretations on different items. Thus both statistical and clinical arguments pointed to the need for a rescoring of the items which would allow for the computation of summary scores and which would make the scores on different items comparable.

With the assistance of Dr. Brazelton, the staff of the Nursing Child Assessment Project undertook such a rescoring. The new scores were on a three-point scale: 1=normal; 2=questionable; 3=deviant. Scale points for individual items were coded as normal or deviant only if all three of the staff examiners and Dr. Brazelton agreed upon the coding. All scale points for which there was disagreement (as well as those points deemed to represent questionable behavior) were coded as questionable. Item 27 was eliminated from this scoring because of its lack of variability. Table 3.7 shows the key for the recoding and the percent of questionable and deviant responses.

At the same time, we undertook a similar recoding for the neurological part of the examination. (See Table 3.8 for the frequency distribution.) A score of 2 on any reflex was considered normal. A score of 1, 3, Assymetrical, and in certain cases Not Elicited (Hand Grasp, Babinski, Standing, Walking, Placing, Crawling, Tonic Deviation of Head and Eyes, Rooting, and Moro) was considered "suspect."

From these recoded neurological and behavioral items, two summary scores were constructed which have been used extensively in our data analysis. The Deviant Behavior Score shows the number of behavioral items on which a "Deviant" score was obtained. For some analyses, the Deviant Behavior Score was treated categorically: None; Low (1 or 2); and High (3 or more). Table 3.9 shows the frequency distribution of the Deviant Behavior Score for the study sample.

This distribution reveals that 84 percent of the sample had two or fewer

## TABLE 3.7

## RECODING OF BRAZELTON 9-POINT SCALE TO 3-POINT SCALE

| | Item | Normal | Questionable | | Deviant | |
|---|---|---|---|---|---|---|
| 1. | Response Decrement to Light | 4 thru 8 | 2,3,9 | (16) | 1 | (2) |
| 2. | Response Decrement to Rattle | 5 thru 9 | 3,4 | (5) | 1,2 | (4) |
| 3. | Response Decrement to Bell | 5 thru 9 | 4 | (2) | 1,2,3 | (5) |
| 4. | Response Decrement to Pinprick | 4 thru 9 | 2,3 | (24) | 1 | (14) |
| 5. | Orientation Inanimate Visual | 4 thru 9 | 3 | (11) | 1,2 | (8) |
| 6. | Orientation Inanimate Auditory | 5 thru 9 | 3,4 | (16) | 1,2 | (2) |
| 7. | Orientation Animate Visual | 4 thru 9 | 3 | (7) | 1,2 | (6) |
| 8. | Orientation Animate Auditory | 4 thru 8 | 3,9 | (29) | 1,2 | (1) |
| 9. | Orientation Animate Vis & Aud | 4 thru 9 | 3 | (9) | 1,2 | (3) |
| 10. | Alertness | 4 thru 9 | 3 | (13) | 1,2 | (9) |
| 11. | General Tonus | 4 thru 6 | 3,7 | (15) | 1,2,8,9 | (6) |
| 12. | Motor Maturity | 4 thru 9 | 2,3 | (24) | 1 | (3) |
| 13. | Pull to Sit | 4 thru 9 | 2,3 | (16) | 1 | (5) |
| 14. | Cuddliness | 4 thru 9 | 3 | (5) | 1,2 | (1) |
| 15. | Defensive Movements | 4 thru 9 | 2,3 | (8) | 1 | (1) |
| 16. | Consolability | 3 thru 9 | 2 | (4) | 1 | (0.5) |
| 17. | Peak of Excitement | 4 thru 7 | 3,8 | (13) | 1,2,9 | (1) |
| 18. | Rapidity of Buildup | 2 thru 7 | 8 | (4) | 1,9 | (5) |
| 19. | Irritability | 2 thru 7 | 8 | (5) | 1,9 | (6) |
| 20. | Activity | 3 thru 8 | 2 | (2) | 1,9 | (0) |
| 21. | Tremulousness | 1 thru 7 | 8 | (5) | 9 | (4) |
| 22. | Startle | 2 thru 7 | 8 | (2) | 1,9 | (3) |
| 23. | Lability of Skin Color | 3 thru 7 | 2,8 | (5) | 1,9 | (0.5) |
| 24. | Lability of States | 2 thru 7 | 8 | (1) | 1,9 | (15) |
| 25. | Self Quieting Activity | 2 thru 9 | -- | | 1 | (2) |
| 26. | Hand Mouth Facility | 2 thru 9 | -- | | 1 | (7) |

(Percent of sample in each group)

## TABLE 3.8

## RELATIVE FREQUENCY DISTRIBUTION ON NEUROLOGICAL EXAMINATION

| | 1 | 2 | 3 | Assymet-rical | Not Elicited | Not Done |
|---|---|---|---|---|---|---|
| Plantar Grasp | 2.1 | 96.4 | -- | 1.0 | -- | 0.5 |
| Hand Grasp | 2.6 | 91.7 | -- | 2.6 | 1.0 | 2.1 |
| Ankle Clonus | 0.5 | 2.6 | 0.5 | -- | 93.8 | 2.6 |
| Babinski | 6.2 | 88.6 | -- | 2.1 | 3.1 | -- |
| Standing | 15.5 | 77.7 | 1.0 | 3.1 | 2.1 | 0.5 |
| Automatic Walking | 19.7 | 75.1 | 0.5 | 1.0 | 3.1 | 0.5 |
| Placing | 8.3 | 81.9 | 0.5 | 5.7 | 2.1 | 1.6 |
| Incurvation | 17.1 | 47.7 | -- | 17.1 | 15.5 | 2.6 |
| Crawling | 17.1 | 73.6 | 2.1 | 2.1 | 3.1 | 2.1 |
| Glabella | 2.6 | 94.8 | -- | -- | -- | 2.6 |
| Tonic Deviation of Head & Eyes | 0.5 | 96.4 | -- | 0.5 | 1.6 | 1.0 |
| Nystagmus | 4.1 | 3.6 | 0.5 | -- | 83.9 | 7.8 |
| Tonic Neck Reflex | 3.1 | 5.7 | -- | 1.6 | 83.9 | 5.7 |
| Moro | 10.9 | 85.5 | -- | 0.5 | 0.5 | 2.6 |
| Rooting Intensity | 8.3 | 85.5 | 1.6 | -- | 2.6 | 2.1 |
| Sucking Intensity | 5.7 | 90.7 | 2.1 | -- | -- | 1.6 |
| Passive Movement - Right Arm | 19.7 | 70.5 | 2.6 | 3.1 | 2.1 | 2.1 |
| Passive Movement - Left Arm | 21.2 | 69.4 | 2.6 | 4.1 | 1.6 | 1.0 |
| Passive Movement - Right Leg | 4.7 | 85.0 | 7.8 | 1.0 | 0.5 | 1.0 |
| Passive Movement - Left Leg | 4.7 | 83.9 | 7.3 | 2.1 | 0.5 | 1.5 |

TABLE 3.9

FREQUENCY DISTRIBUTION OF DEVIANT BEHAVIOR SCORE

| Value | Frequency | Category | Frequency |
|---|---|---|---|
| 0 | 41.7% | None | 41.7% |
| 1 | 31.6% | Low | 42.3% |
| 2 | 10.7% | | |
| 3 | 10.7% | High | 16.0% |
| 4 | 2.1% | | |
| 5 | .5% | | |
| 6 | 2.7% | | |

TABLE 3.10

FREQUENCY DISTRIBUTION OF NEUROLOGICAL SUSPICION SCORE

| Value | Frequency | Category | Frequency |
|---|---|---|---|
| 0 | 18.7% | None | 18.7% |
| 1 | 22.3% | Low | 50.3% |
| 2 | 16.1% | | |
| 3 | 11.9% | | |
| 4 | 8.8% | High | 31.0% |
| 5 | 9.3% | | |
| 6 | 4.1% | | |
| 7 | 2.6% | | |
| 8 | 3.1% | | |
| 9 | 1.0% | | |
| 10 | 1.6% | | |
| 11 | .5% | | |

deviant behaviors while 10.7 percent had three, and 5.3 percent had four or more. The items on which at least 5 percent of the sample showed deviant responses were: response decrement to ball, response decrement to pinprick, orientation to inanimate and animate visual, alertness, general tonus, pull-to-sit, rapidity of build-up, irritability, lability of states, and hand to mouth facility. Essentially no deviant responses were shown to orientation to animate auditory, cuddliness, defensive movement, consolability, peak of excitement, activity, and lability of skin color.

The Neurological Suspicion Score is the number of neurological items on which a "Suspect" score was obtained. For some analyses, the Neurological Suspicion Score was treated categorically: None; Low (1 to 3); and High (4 or more). Table 3.10 shows the frequency distribution of this score for the study sample. The items having the most suspect performance in this sample were standing, walking, placing, incurvation, crawling, and passive movement in the arms. These items require a combination of the reflex activity, postural changes, and muscle tone. In the total sample 69 percent had fewer than four suspect scores, while 31 percent had four or more.

One further attempt at forming summary scores was to use the information from factor analyses to form cluster scores which may be sensitive to the organization of behavior in the neonate. The original nine-point items were factor analyzed (varimax rotation). From this analysis, four factors were identified: Alertness, Irritability, Habituation, and Motor. In keeping with the aim of using only simple computation rules for the formation of summary scores, the possibility of using complete factor scores was rejected. Instead, the items which loaded most heavily on each factor were summed, using the three-point scoring. For each of these cluster scores, then, a low score indicated normalcy and high score, deviancy. Appendix 3.2 lists the four cluster scores and the items which compose them; the median, range and direction of values are reported.

Subsequent to this analysis we participated in a multi-sample factor analysis of the scale with Dr. Milton E. Strauss, Johns Hopkins University, and Dr. Daniel Rourke, at Wayne State University. The results of this analysis have been included in Appendix 3.3. The dimensions identified in the multi-sample analysis are similar to those found in single sample factor studies. The first dimension was defined as responsiveness during alert periods, particularly visual alertness. The items included were 5, 7, 9, and 10. The second dimension they define as an index of arousality. The items included are peak state, rapidity of build-up, irritability, activity level, and muscle tone. The third dimension included the first three response decrement items.

While we did not have the benefit of the Strauss and Rourke analysis in our major analysis of the Brazelton we did form the summary scores previously described from factor analysis of our sample. It is worth noting that our alertness score was composed of the same items as the multi-sample analysis; the irritability score included three of the items from dimension II: peak of excitement, rapidity of build-up, and irritability. The third dimension of the larger factor study had the same items we use in the habituation score. Thus the multi-sample factor analysis provided validation of our alertness and habituation clusters. A direction of future study will be for all investigators to clarify further the most meaningful analysis of the newborn behavioral assessment.

In summary, then, from this study there are four kinds of Brazelton scores available to replace the 27 nine-point items as originally written: the 26 revised three-point items, the Deviant Behavior and Neurological Suspicion Scores, and the four cluster scores.

Reliability and Examiner Effects. Interobserver scoring reliability for the Brazelton exam was assessed before the beginning of the study and at regular intervals throughout the study. One examiner handled the infant and presented stimuli; both examiners scored. Mean pairwise agreement between scorers ranged from 44 percent to 67 percent for the three principal examiners. With leeway of one point in either direction, agreement ranged from 77 percent to 86 percent for the three pairs, and leeway of two points, from 89 percent to 96 percent.

In the study sample, infants were randomly assigned to examiners. In order to see if there were any systematic differences between the infants examined by each of the three principal examiners, analyses of variance were done for the variable sets; these are reported in Table 3.11. For the sample as a whole, there were significant differences in the deviant behavior, irritability, and motor score. When neurological status was controlled for, there were no differences in 87 percent of the subjects who had fewer than six neurological signs. The analysis for the infants with six or more positive neurological signs could not be done, since one examiner had no cases; hence even though assignments to do Brazeltons were done randomly, the subjects were not distributed evenly on the basis of neurological status. The second analysis controlled for perinatal risk; there were examiner differences in the group with none to mild risk (83.5 percent of the sample) on the deviant behavior and irritability score, and no differences in the moderate-severe risk group.

## TABLE 3.11

## SUMMARY OF KRUSKAL-WALLIS ONE-WAY ANALYSIS OF VARIANCE FOR EXAMINER DIFFERENCES[1] ON BRAZELTON VARIABLE SETS

| | | Controlling for | | | |
|---|---|---|---|---|---|
| | | Abnormal neurological | | Risk score | |
| Brazelton Variable Set | Total Sample | less than 6 | 6 or more | none-mild | moderate-severe |
| Deviant behavior score | + | - | CC | + | - |
| Habituation score | - | - | CC | - | - |
| Alertness score | - | - | CC | - | - |
| Irritability score | + | - | CC | + | - |
| Motor score | + | - | CC | - | - |

[1] Number of examiners = 3

$^{+}$Significant differences between examiners at $p < .01$

$^{-}$ No significant differences between examiners at $p < .01$

$^{CC}$Cannot compute (one examiner has no cases)

The differences in the mild-none risk group were accounted for by item 18 (Rapidity of Build-up) and item 19 (Irritability). Our explanation for differences is that it is not an interobserver reliability problem but relates to the differing ability to elicit infant behaviors in examiners and with different infants. This seems a likely explanation for the probable implication that babies with more neurological abnormality or low sensory thresholds were more difficult both to examine and to score.

## Further Dimensions of Newborn Behavior

Following a preliminary discussion of our data with Dr. Heidi Als (May, 1976) we undertook additional analysis of the sample data using a conceptual model developed by Adamson, Als, Tronick and Brazelton, 1975. This model outlines four dimensions, as follows:

I. "Interactive Processes: The infant's capacity to respond to social or potentially social stimuli, especially during the alert state. The orientation items, cuddliness and consolability with intervention were selected to evaluate this dimension."

II. "Motoric Processes: The infant's ability to maintain adequate tone, to control motor behavior and to perform integrated motor actions. Items representing this dimension include motor tone, activity, hand-to-mouth, defensive reaction, motor maturity, pull-to-sit, and the 'reflex' items."

III. "Organizational Processes: State Control: The infant's ability to organize his states, and to shut out disturbing stimuli when asleep (habituation). State modulation is assessed using the following items: rapidity of build-up, peak of excitement, irritability, self-quieting and state lability."

IV. "Organizational Processes: Physiological Response to Stress: The infant's reaction to stress is assessed using the items tremulousness, startles and skim color lability."

Within each dimension criteria have been established to classify the infant's performance as type 1, 2, or 3. The typology labelled 1 characterizes exceptionally good performance; 2 is characterizing the average infant, and 3 indicates worrisome or markedly deficit performance. According to the rules established it has been suggested that typology 2 would describe 50-60% of the infants in a normal nursery population.

Analysis of this study's population on the Interactive Process has been done. The definition of this dimension includes rules for scoring items 5, 6, 7, 8, 9, 10, 14, 16 (all the orientation items plus cuddliness and consolability) to typify the infant's performance as 1, 2, or 3. The typology of the population was distributed as follows: (1) = 24.9%; (2) = 37.8%; (3) = 37.3%. In reviewing the 11 infants identified as premature by examination, six, or 54% of the infants, were classified as type 3. This is noteworthy since it suggests that premature infants at time of hospital discharge are more often less responsive to interaction. In the total sample there were fewer infants typed as average than expected; this may be because the selection criteria included 50% with maternal or infant complications. Most obstetrical-nursery services, however, report that rate of complications.

In comparing the data from the Alertness cluster defined by items 5, 7, 9, and 10, Table 3.12 indicates how the Alertness cluster scores matched the Interactive Processes typology. The correlation coefficient between the two methods was .56 $p < .001$. A score of 4 on the Alertness cluster correctly identified all classified as good on the Interactive Process. The match was less precise in the definition of average and poor. This comparison suggests that both approaches need further testing. While the Alertness cluster classifies over half of the sample as having no deviant or low Alertness scores the Interactive Process typology would appear to over-classify poor performance.

## TABLE 3.12

## COMPARISON OF BRAZELTON INTERACTIVE PROFILE WITH NCAP ALERTNESS CLUSTER

| | | Interactive Processes | | | |
|---|---|---|---|---|---|
| | | Good<br>1 | Average<br>2 | Poor<br>3 | Total |
| Alertness Cluster<br>increase in deviancy | 4 | 48 | 51 | 17 | 116 |
| | 5 | 0 | 14 | 12 | 26 |
| | 6 | 0 | 3 | 9 | 12 |
| | 7 | 0 | 2 | 9 | 11 |
| | 8 | 0 | 0 | 8 | 8 |
| | 9 | 0 | 1 | 4 | 5 |
| | 10 | 0 | 0 | 2 | 2 |
| | 11 | 0 | 0 | 2 | 2 |
| | 12 | 0 | 0 | 1 | 1 |
| | Total | 48 | 71 | 64 | 183 |

## MINOR PHYSICAL ANOMALIES

### Overview

Infants born with severely handicapping major congenital defects, for example, anencephaly, meningomyelocele, cyanotic congenital heart disease trisomy 13-15, will obviously have an aberrant developmental course. The same is true for those with the less overwhelming major defects such as Down's Syndrome or rubella syndrome. The diagnosis and maintenance of children with major defects involve a large body of knowledge and skills.

In developing screening/assessment processes for less overtly impaired children, a focus on the more minor anomalies offers a greater contribution. The so-called minor malformations (Smith, 1970) or minor physical anomalies (Waldrop, 1968; Waldrop and Goering, 1971; Waldrop and Halverson, 1971), if they appear in clusters, seem to be predictive of more significant major congenital anomalies or of unusual behavior patterns.

The studies of Waldrop, Pedersen and Bell (1968), Waldrop and Goering (1971), Waldrop and Halverson (1971) found that a high score on an index of minor physical anomalies is related to the incidence of hyperactivity in boys. There is the strong suspicion that whatever influences embryonic development to produce such minor physical variations as epicanthal folds, hyperteleorism, low set ears, high arched narrow palate, single or double simian lines, or clinodactyly of the fifth finger, may also alter the physiology or biochemistry of the CNS, and possibly be associated with behavioral control mechanism. An alternative explanation is that if a child has several minor physical anomalies, his appearance will provoke unusual responses from persons in his environment. Recent studies, however, asking teachers to select from a group of individual photographs children they thought had minor anomalies, revealed no association with their selection and the child's minor anomaly score (Quinn, 1976).

Waldrop, Pedersen and Bell (1968) selected a number of physical characteristics of children and gave them weighted scores, depending on the degree to which the defect deviated from normal. These anomalies included: hard-to-comb-down, electric hair; unusually prominent epicanthal folds; hyperteleorism; low-set ears; adherent earlobes; malformed and asymmetrical ears; abnormalities of the shape of the hard palate; furrowed tongue; incurved fifth finger; single transverse palmar crease; variation of length of the third toe in relation to the second toe; partial syndactyly of the two middle toes; and an unusually wide gap between the first and second toe. Since any particular defect was relatively rare, a weighted score of the combination of all defects was used. Through an elaborate process of observation of 74 normal nursery school children (43 males and 31 females) by trained observers on different days, certain behaviors seemed to correlate with the anomaly score. Behaviors such as inability to delay gratification, nomadic play, frenetic play, spilling and throwing, opposing peers, and perseveration were especially characteristic of both the boys and the girls who also had the highest anomaly score.

In a later study in which Waldrop and Goering (1971) report their attempt to replicate the first study, it was again found that boys with high anomaly scores are likely to be hyperactive and organically driven in their behavior. This relationship is not, however, found for girls. In fact, Waldrop and Goering report that the girls with the higher anomaly score tend to be more inhibited and fearful. They also report that a follow-up study of the original 74 nursery school children five years later show that the selected anomalies and the greater hyperactivity in a free play situation were still correlated.

Thus, the work of several investigators has shown that the presence of minor physical anomalies is related to childhood behavior disturbances, specifically those of an aggressive, hyperkinetic, and intractible nature.

An assessment method to identify these children in infancy would assist in early diagnosis and treatment of the underlying causes of the problems. It would also alert the health care system to the need for closer follow-up of the child.

Although the research evidence is far from adequate linking these minor physical anomalies to child behavior, it is sufficient to encourage the use of the developed assessment methods as a way of identifying children at high risk of later behavior problems.

Description and Sample Distribution on Minor Anomalies Assessment. The method tested for its results and feasibility in our newborn population is based on the work of Waldrop, Pedersen and Bell. We originally planned to do the assessment at the newborn period along with the behavioral assessment. Examiners found it too demanding to do both during the same examination period; additionally, the facial puffiness present in the newborn made it hard to evaluate epicanthic folds. Thus the assessment of the mouth (palate and tongue), hands, and feet were done at the four-month home visit. All home visitors were trained to a level of 85 percent or above agreement before doing independent assessments. Interobserver ratings were done on approximately one quarter of the cases; the observer agreement was high throughout the study. In addition, repeat assessments were done on the special cohort sample at 1 and 4 months for assessment of anomalies of the mouth, tongue or hands. Table 3.13 presents the frequency distribution for the total sample at 4 months and the special cohort at 1 and 4 months.

TABLE 3.13

MINOR ANOMALIES (MOUTH, HANDS, FEET) FREQUENCY DISTRIBUTIONS FOR TOTAL SAMPLE AND SPECIAL COHORT

| | Weight | *Total Sample (N=178) | One Mo. Cohort (N=27) | Four Mo. Cohort (N=28) | Eight Mo. Cohort (N=27) | Twelve Mo. Cohort (N=25) |
|---|---|---|---|---|---|---|
| | | N % | N % | N % | N % | N % |
| Steepled palate | 2 | 6 ( 3.4) | 1 ( 3.7) | 0 | MEASUREMENTS NOT TAKEN | MEASUREMENTS NOT TAKEN |
| Flat-narrow palate | 1 | 11 ( 6.2) | 0 | 0 | | |
| Furrowed tongue | 1 | 0 | 0 | 0 | | |
| Smooth-rough spotted tongue | 0 | 1 ( 0.6) | 0 | 0 | | |
| Marked curve fifth finger - R | 2 | 3 ( 1.7) | 0 | 1 ( 3.6) | | |
| Marked curve fifth finger - L | 2 | 3 ( 1.7) | 0 | 1 ( 3.6) | | |
| Slight curve fifth finger - R | 1 | 56 (31.5) | 5 (18.5) | 4 (14.3) | | |
| Slight curve fifth finger - L | 1 | 45 (25.3) | 4 (14.8) | 4 (14.3) | | |
| Single transverse crease - R | 1 | 1 ( 0.6) | 0 | 0 | | |
| Single transverse crease - L | 1 | 2 ( 1.1) | 0 | 0 | | |
| Bridged transverse crease - R | 1 | 3 ( 1.7) | 0 | 0 | | |
| Bridged transverse crease - L | 1 | 3 ( 1.7) | 0 | 0 | | |
| Sydney line - R | 0 | 6 ( 3.4) | 0 | 1 ( 3.6) | | |
| Sydney line - L | 0 | 4 ( 2.2) | 0 | 0 | | |
| Third toe longer than second - R | 2 | 12 ( 6.7) | 0 | 3 (10.7) | | |
| Third toe longer than second - L | 2 | 9 ( 5.1) | 0 | 3 (10.7) | | |
| Third toe equal to second - R | 1 | 35 (19.7) | 4 (14.8) | 4 (14.3) | | |
| Third toe equal to second - L | 1 | 34 (19.1) | 3 (11.1) | 3 (10.7) | | |
| Partial syndactyly toes - R | 1 | 4 ( 2.2) | 0 | 0 | | |
| Partial syndactyly toes - L | 1 | 4 ( 2.2) | 0 | 0 | | |
| Gap between toes - R | 1 | 26 (14.6) | 1 ( 3.7) | 0 | | |
| Gap between toes - L | 1 | 28 (15.7) | 1 ( 3.7) | 0 | | |

*Total sample measurements on mouth, hands, and feed were taken at four months

In the cohort more anomalies of the fingers and toes were noted at the 4-month period. While several factors may account for this finding, it is difficult to examine the hands or feet of the newborn carefully without eliciting the palmar grasp or planter reflex, which make observation of the digits harder. In the total sample the most frequent anomaly was curving of the fifth finger on the right hand (31.5%); this was also true in the cohort group (14.3%). The only physical anomaly of the hands, tongue, or mouth not found in this sample was a furrowed tongue.

The remaining assessments for anomalies of the ears, eyes, and head were made at 8 months to provide a measure taken after the period of most accelerated growth of the brain and head in the first 12 months of growth. Table 3.14 presents the frequency distribution for the total population at 8 months and the repeat measure on the special cohort at 1, 4, 8, and 12 months. It is obvious that the repeat measures reflect the changing configuration of the head, face, and ears. It is particularly interesting to detect the apparent disappearance of the epicanthical fold in many infants as the face changes shape and the head grows. Therefore any assessment of the head, face, or ears, at least during the first year of growth, must take age into account.

Data Reduction. A score was given to each anomaly (see Child Health Assessment, Part 1: A Literature Review, pp. 45-54, for scoring weights and descriptions). The weighted scores for each child on the 21 anomaly characteristics was summed for the 4- and 8-month assessment. The median was 3.0 and the range 0-9. It is important to note that the minor anomalies format for this study differed somewhat from the original study. The changes have been reported in the Child Health Assessment, citation just previously mentioned. Summarizing the changes, added were frontal hair whorls, further

## TABLE 3.14

## MINOR ANOMALIES (EARS, EYES, HEAD) FREQUENCY DISTRIBUTIONS FOR THE TOTAL SAMPLE AND SPECIAL COHORT

| | Weight | *Total Sample (N=164) N % | One Mo Cohort (N=27) N % | Four Mo Cohort (N=28) N % | Eight Mo Cohort (N=27) N % | Twelve Mo Cohort (N=25) N % |
|---|---|---|---|---|---|---|
| Low seated ear - R | 2 or 1 | 5 (3.0) | 0 | 0 | 0 | 0 |
| Low seated ear - L | 2 or 1 | 5 (3.0) | 1 (3.7) | 0 | 0 | 0 |
| Adherent lobe - R | 2 or 1 | 15 (9.1) | 1 (3.7) | 3(10.7) | 0 | 0 |
| Adherent lobe - L | 2 or 1 | 15 (9.1) | 1 (3.7) | 3(10.7) | 0 | 0 |
| Malformed ear - R | 1 | 4 (2.4) | 1 (3.7) | 0 | 0 | 0 |
| Malformed ear - L | 1 | 3 (1.8) | 1 (3.7) | 0 | 0 | 0 |
| Soft Pliable ear - R | 0 | 1 (0.6) | 2 (7.4) | 0 | 1 (3.7) | 0 |
| Soft Pliable ear - L | 0 | 2 (1.2) | 2 (7.4) | 0 | 0 | 0 |
| Asymmetrical ears | 1 | 6 (3.7) | 2 (7.4) | 3(10.7) | 1 (3.7) | 4(16.0) |
| Deeply covered epicanthus - R | 2 | 59(36.0) | 3(11.1) | 7(25.0) | 4(14.8) | 1 (4.0) |
| Deeply covered epicanthus -L | 2 | 61(37.2) | 3(11.1) | 7(25.0) | 4(14.8) | 1 (4.0) |
| Partly covered epicanthus - R | 1 | 57(35.0) | 6(22.2) | 15(53.6) | 9(33.3) | 3(12.0) |
| Partly covered epicanthus - L | 1 | 52(31.9) | 5(18.5) | 15(53.6) | 9(33.3) | 3(12.0) |
| Two or more hair whorls | 0 | 10 (6.3) | 4(14.8) | 3(10.7) | 1 (3.7) | 1 (4.0) |
| Frontal hair whorls | 1 | 4 (2.6) | 2 (7.4) | 1 (3.6) | 0 | 0 |
| Auricular length - R | | | | | | |
| less than or equal to 3.5 cm | 2 | M=4.67 | M=4.03 | M=4.56 | M=4.63 | M=4.75 |
| 3.6 to 4.2 cm | 1 | SD=0.31 | SD=0.30 | SD=0.35 | SD=0.30 | SD=0.31 |
| Auricular length - L | | | | | | |
| less than or equal to 3.5 cm | 2 | M=4.65 | M=4.04 | M=4.55 | M=4.64 | M=4.76 |
| 3.6 to 4.2 cm | 1 | SD=0.37 | SD=0.30 | SD=0.34 | SD=0.29 | SD=0.34 |
| Inner canthal distance | | | | | | |
| equal to or greater than 1.5SD | 2 | M=2.60 | M=2.38 | M=2.40 | M=2.43 | M=2.46 |
| above or below | | SD=0.30 | SD=0.20 | SD=0.21 | SD=0.17 | SD=0.21 |
| equal to or below 1.0 &1.4 SD above or below normal | 1 | | | | | |
| OFC | | | | | | |
| equal to or greater than 1.5SD | 2 | M=44.45 | M=37.20 | M=41.50 | M=44.51 | M=45.80 |
| above or below normal | | SD-1.35 | SD=2.48 | SD= 1.34 | SD= 1.59 | SD= 1.28 |

*Total sample measurements on ears, eyes, and head were taken at eight months definition of ear placement, added Sydney line and deleted fine electric hair. The range of possible scores was 0-43.

Table 3.15 presents the frequency distribution for weighted minor anomaly scores. In this report further data analysis uses this weighted minor anomaly score; a high score means either more and/or more severe anomalies. From Table 3.15 it is evident that only 4.88 percent of sample had none of the minor anomalies while 6.10 percent had a weighted score of 7 or above. In other studies it has been the pattern and number of anomalies as reflected in the weighted score that shows an association with behavioral control problems.

Our examination procedure was to do the minor anomaly assessment at two time points to accommodate other concurrent observations and interviews. The fact that we had 164 out of 178 complete records suggests that it would be preferable to collect all information at one time, although with this procedure we were able to retrieve total scores on over 90 percent of those with the first assessment at 4 months.

There were some differences on the repeated assessments for the cohort sample. The biggest differences were on anomalies of the eyes and ears. This information is in Table 3.14. There were more reports of epicanthal folds and adherent ear lobes at 4 months than at 1, 8, and 12 months. Some of this variation could possibly be accounted for by the very rapid growth of the head during the first months of life. It is doubtful if this factor would significantly influence the child's total weighted score.

Thus the assessment of minor physical anomalies proved to be a measure that could be reliably obtained. The value of obtaining the measure awaits further study; if it does have predictive value in identifying children who have a high probability for behavioral control problems, our data suggests that the information could be obtained during the first year of life.

## TABLE 3.15

## FREQUENCY DISTRIBUTION FOR WEIGHTED MINOR ANOMALY SCORE

| Weighted Minor Anomaly Score | N | % |
|---|---|---|
| 0 | 8 | 4.88 |
| 1 | 24 | 14.63 |
| 2 | 36 | 21.95 |
| 3 | 38 | 23.17 |
| 4 | 20 | 12.19 |
| 5 | 12 | 7.32 |
| 6 | 16 | 9.75 |
| 7 | 6 | 3.66 |
| 8 | 2 | 1.22 |
| 9 | 2 | 1.22 |
| Total | 164 | |

Mean = 3.22; S.D. = 1.979

# SLEEP-ACTIVITY RECORDS

## Overview

Several investigators have found that disturbed sleeping habits among infants are often a sign of neurodevelopmental disorder. Sleep patterns also have been found to reflect such disturbances in the home as parental anxiety, or such environmental conditions as temperature or noise, which can if necessary be corrected. Likewise, sleep problems may arise from unrecognized hunger or illness, e.g., sinusitis otitis media or allergies. Being able to identify infants with sleep problems would enable nurses to assist in remedying the underlying problem.

We were interested in looking at the relationship between the infant's sleep-wake pattern, as recorded by the mother, and its correlation with later behaviors. The sleep record found in the Appendix 3.4 was filled out by the mother the week following the home visit at 1, 4, 8, 12 months of age. On this record she was asked to record when the child slept, cried, when he ate, and when there were caretaking activities, bowel movements, or urination. There was no attempt to check the validity of the mother's recording, nor was there any weekly test-retest reliability.

Data Reduction. Appendix 3.5 provides a summary of the variables scored from the sleep-activity record. Considerable time was spent in coding data from the sleep-activity record; approximately 15-30 minutes were required to code each record, depending on the mother's preciseness in recording. The variables chosen for coding were both clinically meaningful and able to be reliably coded. The easiest to score were frequency of feedings, duration of longest sleep period, and number of night wakenings. An approximately 15-minute margin was acceptable in scoring the hours of sleep for the regularity variable; in addition the criterion for counting it as a regular feeding or sleep hour was that it occurred at the same hour ± minutes on five out of the seven 24-hour periods.

*Distribution of Sample on Sleep-Activity Record*. Table 3.16 provides the descriptive statistics for variables taken from the sleep activity record. It is impressive to note that the percent of mothers returning the sleep-activity record never dropped below 65 percent. The number returning at 1 month was 85 percent, at 4 months 78 percent, at 8 months 76 percent, and at 12 months 65 percent. This represents an involvement of the mother's time and commitment to making and recording observations about her own child. In reviewing the table it is necessary to understand the composition of each variable set found in Appendix 3.5.

*Feedings per day*. As expected, the number of feedings per day decreased during the first year of life from a median of 5.6 feedings at 1 month to 4.0 at 12 months. The *regularity of feedings* increased with age as expected. The range was broad, from no regularity in some infants to 100 percent in others.

In the sleep recordings, information about the *longest period of night sleep* and the *regularity of night* sleep are of interest. At 1 month the longest night's sleep, sleep after the parent's bedtime, was 6.6 hours with a range from 2.5 to 12 hours. Again a developmental trend is noted, with an increasing duration of sleep during the night. The regularity of night sleep in this sample is high at all ages, even at 1 month of age. The length of the *longest day's sleep* period shows again a developmental trend, this time being longer at 1 month than at 12 months. The range is from 2 hours to 7 hours a day at 1 month, and from 1.5 hours to 5.2 hours at 12 months. The data on regularity of day sleep demonstrate either that the infants did not

TABLE 3.16

DESCRIPTIVE STATISTICS FOR VARIABLES FROM SLEEP-ACTIVITY RECORD

| Variable | Age | Median | Range | N |
|---|---|---|---|---|
| Feedings per Day | 1 | 5.6 | 2.4-10.4 | 161 |
| | 4 | 4.9 | 2.9-10.4 | 139 |
| | 8 | 4.8 | 3.0-9.6 | 130 |
| | 12 | 4.0 | 2.1-9.4 | 112 |
| Regularity of Feedings | 1 | 38.9% | 0-100% | 161 |
| | 4 | 58.2 | 0-100 | 139 |
| | 8 | 68.6 | 0-100 | 130 |
| | 12 | 76.1 | 28-100 | 112 |
| Longest Night Sleep | 1 | 6.6 hrs. | 2.5-12.0 hrs. | 161 |
| | 4 | 10.7 | 3.5-14.0 | 139 |
| | 8 | 10.7 | 6.0-14.2 | 130 |
| | 12 | 11.2 | 6.0-14.7 | 112 |
| Regularity of Night Sleep | 1 | 83.6% | 40.0-91.7% | 161 |
| | 4 | 99.9 | 66.7-100 | 139 |
| | 8 | 99.9 | 57.1-100 | 130 |
| | 12 | 99.9 | 62.5-100 | 112 |
| Longest Day Sleep | 1 | 3.5 hrs. | 2.0-7.0 hrs. | 161 |
| | 4 | 2.9 | 1.0-6.0 | 139 |
| | 8 | 2.4 | 0.7-5.0 | 130 |
| | 12 | 2.5 | 1.5-5.2 | 112 |
| Regularity of Day Sleep | 1 | 5.5% | 0-43.5% | 161 |
| | 4 | 0.1 | 0-33.3 | 139 |
| | 8 | 0.1 | 0-23.1 | 130 |
| | 12 | 0.1 | 0-23.1 | 112 |
| Regularity of All Sleep | 1 | 31.7% | 12.5-54.2% | 161 |
| | 4 | 39.9 | 20.8-62.5 | 139 |
| | 8 | 40.4 | 5.9-58.0 | 130 |
| | 12 | 43.0 | 20.8-58.3 | 112 |
| Night Awakenings | 1 | 1.6 | 0-5.7 | 161 |
| | 4 | 0.5 | 0-3.4 | 139 |
| | 8 | 0.3 | 0-3.6 | 130 |
| | 12 | 0.2 | 0-2.5 | 112 |

have regular day sleep or that their mothers were less precise about recording day sleep. The amount of day sleep occurring at the same time each day, five days of the seven, was minimal and the range was from 0 to 43.5 percent at 1 month and decreased from 0 to 23.1 percent at 12 months. The *measure of regularity of all sleep* is a combination of the regularity of night sleep and of day sleep. The score shows a developmental trend from a regularity of 31.7 at 1 month to 43.0 percent at 12 months. The regularity of all sleep is highly influenced by the decreased regularity of day sleep. *Report of night awakenings* indicate the average baby woke once during the night at 1 month of age, and that subsequent night awakenings decreased with age.

Table 3.17 presents the consistency over time for all eight variables. The number of *feedings per day* at 1 month is significantly correlated with the number of feedings at 4, 8, and 12 months; it is, however, more highly correlated with the 4-month period; the 4-month with the 8-month and the 8-month with the 12-month. The *regularity of feedings* becomes more consistent after 4 months of age. The duration of the *longest night sleep* becomes more stable after 4 months of age, while there is a modest correlation in the duration of *day sleep* from 1 month on. The *regularity of night sleep* is significantly correlated with each preceding age, whereas there is no correlation with the preceding age in *day sleep* until after 8 months. The measure of combined *day and night sleep regularity* shows significant correlations with each preceding age; the correlation of 4 months with 12 months, however, is almost as great as 8 months with 12 months. On night awakenings there is no significant correlation between 1 month and 12 months and between 4 months and 12 months, although each age is correlated with the subsequent age. There is a significant correlation between 8 and 12 months of age.

## TABLE 3.17

## CONSISTENCY OVER TIME OF VARIABLES FROM SLEEP-ACTIVITY RECORD

| | | 4 Months | 8 Months | 12 Months |
|---|---|---|---|---|
| FEEDINGS PER DAY | 1 Month | .37* | .17* | .17* |
| | 4 Months | | .44* | .28* |
| | 8 Months | | | .48* |
| REGULARITY OF FEEDINGS | 1 Month | .02 | .02 | -.02 |
| | 4 Months | | .24* | .18* |
| | 8 Months | | | .34* |
| LONGEST NIGHT SLEEP | 1 Month | .21* | .03 | .06 |
| | 4 Months | | .28* | .31* |
| | 8 Months | | | .29* |
| REGULARITY OF NIGHT SLEEP | 1 Month | .19* | .06 | -.04 |
| | 4 Months | | .24* | -.08 |
| | 8 Months | | | .17* |
| LONGEST DAY SLEEP | 1 Month | .13* | .10* | .11* |
| | 4 Months | | .11* | .05 |
| | 8 Months | | | .24* |
| REGULARITY OF DAY SLEEP | 1 Month | .06 | .12* | .03 |
| | 4 Months | | .07 | .13* |
| | 8 Months | | | .20* |
| REGULARITY OF ALL SLEEP | 1 Month | .16* | .04 | .08 |
| | 4 Months | | .34* | .29* |
| | 8 Months | | | .29* |
| NIGHT AWAKENINGS | 1 Month | .27* | .21* | .06 |
| | 4 Months | | .41* | .11 |
| | 8 Months | | | .22* |

*Kendall correlation coefficients; $p < .05$; Range of N = 101-135

The data presented in Tables 3.16 and 3.17 were recorded by mothers. The consistency of the data over time and the duration and regularity reported are consistent with what is known about infant sleep during the first year of life. Certainly parents have been and will continue to be the most likely source of such information.

Appendix 3.6 - 3.9 presents the intracorrelations among the sleep activity variables at 1, 4, 8, and 12 months. A consistent pattern emerges across ages: the more feedings per day, the shorter the duration of night and day sleep, the less regular both night and day sleep, and the more night awakenings. The regularity of feedings at 1 month is negatively correlated with night awakenings, while at 4 months it is positively correlated with regularity of day sleep and again negatively correlated with night awakenings. Again at 8 and 12 months the regularity of feedings is correlated with the infant's day and night sleep patterns. This pattern illustrates the significant influence of feeding and sleep periods on each other; it is an interactive cycle.

The number of night awakenings at 1, 4, 8, 12 months is negatively correlated at each age, with the duration of the longest night sleep and the regularity of night sleep.

The duration of the longest day sleep is positively correlated with regularity of day sleep at each age. There is no correlation between the longest duration of day and night sleep until a positive correlation at 12 months of age.

The regularity of all sleep is more positively correlated with day sleep at all ages than with night sleep, especially at 12 months.

## INFANT CHARACTERISTICS - ASSOCIATIONS AMONG VARIABLES

Having completed descriptions of the infant measures, presentation of the sample's distributions and reliability data, we turn to data showing what associations these infant measures have with each other.

Starting with the measure of newborn behavioral responsiveness, we felt this measure would be helpful in identifying the responses of infants which may be related to their later behavior and learning. The association of the cluster scores (alertness, irritability, habituation, and motor) with gestational age, neurological performance, and the minor anomaly score are found in Table 3.18. The total deviant behavior score correlates in a logical way to gestational age, the more premature the more deviant behaviors. Likewise, the number of deviant behaviors is greater for infants who show neurological abnormalities, however there is essentially no correlation with the minor anomaly score. The deviant behavior score correlates with all four cluster scores, highest with irritability and alertness; this is expected since the irritability and alertness clusters contain more items than the habituation or motor score. Among the cluster scores, alertness correlates in a positive direction with habituation, suggesting that the non-alert infants habituated less readily. The irritability score was significantly associated with all three other cluster scores and gestational age in a positive direction. This is consistent with our clinical impression. The explanation of the correlation with gestational age probably relates to the lack of irritability seen in the hospital period for the immature infant.

While not significant correlations, the relationship between the minor anomaly score and the neurological suspicion score and the motor score are in the expected direction, the higher the anomaly score the more neurological and motor abnormality.

TABLE 3.18

CORRELATIONS AMONG NEWBORN BEHAVIORAL ASSESSMENT SCORES, NEUROLOGICAL SUSPICION SCORES AND MINOR ANOMALY SCORES

| | Neurological Suspicion Score | Deviant Behavior Score | Habituation Score | Alertness Score | Irritability Score | Motor Score | Minor Anomoly Score |
|---|---|---|---|---|---|---|---|
| Gestational Age | -.04 | -.11* | .08 | -.04 | .09* | -.13* | -.04 |
| Neurological Suspicion Score | | .19* | .03 | -.02 | .11* | .05 | .08 |
| Deviant Behavior Score | | | .29* | .38* | .42* | .28* | .03 |
| Habituation Score | | | | .10* | .10* | .09* | .01 |
| Alertness Score | | | | | .14* | .11* | -.04 |
| Irritability Score | | | | | | .05 | -.02 |
| Motor Score | | | | | | | .06 |

*Kendall Correlation Coefficients; $p < .05$; Range of N = 131-193.
A = 28, E = 1.4, O = 14.

In examining the pattern of association with newborn behavioral responsiveness, perinatal risk and maternal education, the motor score was more deviant in high perinatal risk and for infants whose mothers had less formal schooling. The only sex difference was that female infants showed more irritable behavior. The mean cluster score was 5.49 for females and 5.17 for males; this difference is significant at the $>$ .001 level.

How does early behavior of the neonate correlate with later behavior? We can only provide a beginning answer to that question. Table 3.19 presents the statistically significant correlations between neonatal behavior, the mother's report of infant sleep and activity during the first year.

First, the number of correlations during each age period remain fairly constant, although logically we would expect more associations the closer in time the variables are measured. While not all of the correlations make sense, the number of feedings per day during the early months were greater for infants who had less deviant behavior and better habituation scores, while at 8 and 12 months children who were less irritable as newborns had more feedings per day. The meaning of that relationship is hard to explain; parents whose children have later developmental problems often describe an early pattern of feeding difficulties--perhaps this is the reverse--children with more normal behavior are fed more.

Most of the correlations with sleep measures indicate that with higher deviancy scores there is a tendency for longer periods of night sleep particularly at 12 months; since the correlations are with alertness and the total deviancy score this may represent the child who was a less responsive newborn, who later sleeps longer and has more regularity of night sleep.

In general the infant with less response decrement to repetitive stimuli

## TABLE 3.19

## INFANT BEHAVIORAL VARIABLES RELATED TO VARIABLES FROM THE SLEEP-ACTIVITY RECORD AT 1, 4, 8, AND 12 MONTHS*

| | Age (in mos.) | Neurological Suspicion Score** | Deviant Behavior Score | Habituation Score | Alertness Score | Irritability Score | Motor Score | Minor Anomaly Score | Gestational Age |
|---|---|---|---|---|---|---|---|---|---|
| Feedings per day | 1 | | -.16 | -.13 | | | | | |
| | 4 | | | -.11 | | | | | |
| | 8 | | | | | -.11 | | | |
| | 12 | | -.11 | | | -.11 | | | |
| Regularity of feedings | 1 | | | | | | | | .09 |
| | 4 | .10 | | | | | | | |
| | 8 | | | | | | | | |
| | 12 | | | | | | | | |
| Longest night sleep | 1 | | | | | | -.11 | | .10 |
| | 4 | | | .11 | | | | | |
| | 8 | | | | | | | .12 | |
| | 12 | | .15 | | .14 | | | | |
| Regularity of night sleep | 1 | | | | | | -.19 | | |
| | 4 | | | | | | | | |
| | 8 | | | | .20 | | | | |
| | 12 | | | .13 | .16 | | | | |
| Longest day sleep | 1 | | | | | | | | |
| | 4 | | | -.15 | | | | | |
| | 8 | | | | | | | | |
| | 12 | | | | | | | | |
| Regularity of day sleep | 1 | | .10 | | | | .10 | .12 | |
| | 4 | | | | | | | | |
| | 8 | | | .14 | | | | | |
| | 12 | | | .17 | | | | | |
| Regularity of all sleep | 1 | | | | | | | | .11 |
| | 4 | | .10 | | | | | | |
| | 8 | .10 | | | | | | | |
| | 12 | | | | | | | | |
| Night awakenings | 1 | -.10 | | | | | | | |
| | 4 | | | | | .10 | | | |
| | 8 | | | | -.13 | | | | |
| | 12 | | | | | | | | |

*Kendall Correlation Coefficients; $p < .05$, Range N = 95-161.

A = 224, E = 11.2, O = 30.

**high score is more deviant.

has more regular periods of sleep after 8 months while the infant with good response decrement showed longer day sleep at 4 months. Certainly the relationship is logical as one would expect that a child who could "shut out" environmental events would sleep better during the day when there is likely to be more activity. Considering that the correlations of feeding and sleep behavior are between observations of behavior made at the newborn period and parent report at later ages the ability to detect relationships which have some logical explanation is impressive.

In examining the relationship of infant's sleep and activity recorded by the mother and the perinatal risk score there was a negative association (r = -.17) between risk and day sleep at 12 months and a positive association with the regularity of day sleep at 12 months. With respect to maternal education, there was a positive association between number of feedings at 1 month (r = .13) and the regularity of sleep at 1 and 8 months with night sleep (r = .13, .18) and with the regularity of all sleep at 4 months (r = .14). The correlation between night awakenings at 4 months was (r = -.16). Thus there is a tendency for mothers with more education to feed their infant more often at 1 month and for the infant to have more regular night sleep at 1 and 8 months, more regular day sleep at 4 months and fewer night awakenings at 4 months.

Several other findings with the sleep-activity record are interesting. At 1 month the prematurely born infants tended to have more irregularity in their feeding and sleep schedule. There was a significant difference in the length of night sleep at 8 months based on sex. Female infants had a median duration of 11.04 hours and males 10.40 hours, significant at the .02 level.

Table 3.20 summarizes a possible module to use in forecasting first

TABLE 3.20

## SUGGESTED NEWBORN INFORMATIONAL BASE FOR FORECASTING FIRST YEAR FEEDING AND SLEEP PATTERNS

| First Year Feeding and Sleep | Forecast Newborn Behaviors or Characteristics | |
|---|---|---|
| | Ages 1 - 4 Months | 8 - 12 Months |
| Feedings | | |
| Number | habituation score<br>maternal education | irritability score |
| Regularity | gestational age<br>neurological suspicion score<br>maternal education | maternal education |
| Sleep | 1 - 4 Months | 8 - 12 Months |
| Length | | |
| day | habituation score | none |
| night | motor maturity score<br>habituation score<br>gestational age | minor anomaly score<br>sex |
| Regularity | | |
| day | motor maturity score<br>minor anomaly score | habituation score |
| night | motor maturity score | habituation score |
| Night wakening | irritability score | alertness score |

year sleep and feeding behavior. The underlying theme seems to be the infant's ability to deal with environmental stimuli. For instance, the association of the habituation response, and irritability, with number of feedings suggests that either the infant with poor response decrement or irritability is not a frequent eater or that mother has learned not to bother the sleeping infant because he/she is difficult to get back to sleep. It is interesting to note that night awakenings at 8 months are associated with alert newborn behavior, perhaps a sign of good self-differentiation ability and hence more anxiety about separation brought on by sleep or night makes a beginning case for suggesting advanced development in alert infants.

In looking beyond these early characteristics of the infant several trends emerge in the correlations between neonatal behavioral responsiveness and later behavior of the mother and infant. While these trends await further confirmation in other studies they are important to note. The data suggest that the non-alert, non-responsive infant shows less readiness to learn when observed in a learning situation all during the first year. Mothers of these infants report a decreasing amount of involvement with the infant over the year and mothers have less expectations for the child's school achievement when queried at 8 months. In addition, by home visitors' observations there was less optimal communication between the mother and infant when the infant was not alert and responsive as a newborn.

All these relationships of early behavior with later behavior and maternal expectations support the possible contribution of early behavioral responses to prediction of later developmental outcomes. Even if that were not the case our experience in behavior assessments of the neonatal has convinced us of their value in providing a sensitivity on the part of nurses and other health care providers to the newborn as individuals. This "tuning in" can easily be put to use in helping the parent develop the same sensitivity to the exciting capacity the newborn has to organize his behavior and respond to environmental stimuli. Likewise it has been our experience that the infant sleep-activity recording by the mother becomes an important descriptive picture of how the infant and his environment are fitting together. We found that when mothers were experiencing problems with feeding or sleeping this recording helped the mother understand the problem herself or become freer to discuss the problem; often a full page of notes would accompany the record that then could be readily responded to by the nurse.

Thus the collection of data about perinatal risk, gestational age, newborn behavioral responsiveness, minor physical anomalies, and sleep-wake activities are measures which can be made, given appropriate training. The predictive validity of the measures await data analysis from follow-up studies of the sample at preschool and school age.

The use of a perinatal complication scoring system enhances the systematic collection of information already available in most perinatal health care situations. We advocate a method such as the one used in this study to provide the child health care provider with background information. Clearly the absence or presence of perinatal complications and maternal education continue to be the most available and predictive variables currently used. While we are not currently in a position to support the predictive validity of the minor anomaly score, the newborn's behavioral responsiveness, and the pattern of sleep-activity from this study the answers will be sought in follow-up of this population.

We have been particularly impressed with the descriptive value of the Brazelton Newborn Behavioral Assessment. The use of this measure does require training and we strongly advocate making provision that all nurses trained at the post-baccalaureate level in maternal-child nursing have this as part of their nursing curricula.

In addition, further work on a different form of newborn behavioral assessment merits doing since during the normal course of newborn nursery care, i.e., bathing, diaper-changing, and feeding, observations can routinely be made about the newborn's responsiveness. It seems probable that a standardized method of reporting the newborn's behavior could be developed that would fit into existing practice.

The newborn infant provides an early opportunity to begin the observation of exciting and possibly predictive patterns of behaviors and information. Through this study we have begun to find out how these measures can be collected by nurses, parents and other health care providers.

## APPENDIX 3.1

### ADJUSTED FREQUENCY PERCENTAGE OF SCORES ON ITEMS 1 - 26 OF THE BRAZELTON NEWBORN BEHAVIORAL ASESSMENT SCALE

| Item Name | Item Score 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 1. Response Decrement to Light | 2.4 | 3.6 | 4.2 | 7.8 | 16.8 | 16.0 | 21.0 | 16.8 | 10.8 |
| 2. Response Decrement to Rattle | 2.5 | 1.9 | 2.5 | 3.1 | 9.4 | 10.0 | 15.6 | 32.5 | 22.5 |
| 3. Response Decrement to Bell | 1.3 | 2.6 | 2.0 | 2.6 | 10.5 | 16.4 | 17.1 | 28.3 | 19.1 |
| 4. Response Decrement to Pinprick | 18.2 | 6.8 | 25.0 | 16.9 | 15.5 | 7.4 | 4.1 | 5.4 | 0.7 |
| 5. Orientation Inanimate Visual | 1.6 | 7.0 | 11.4 | 28.6 | 16.2 | 7.0 | 14.1 | 5.9 | 7.6 |
| 6. Orientation Inanimate Auditory | 0.5 | 1.1 | 3.2 | 13.2 | 7.9 | 19.6 | 10.6 | 18.5 | 25.4 |
| 7. Orientation Animate Visual | 2.2 | 3.8 | 7.0 | 28.1 | 12.4 | 9.2 | 28.1 | 8.1 | 1.1 |
| 8. Orientation Animate Auditory | 1.1 |  | 3.2 | 10.7 | 8.6 | 15.0 | 19.3 | 15.0 | 26.2 |
| 9. Orientation Animate Vis & Aud | 1.1 | 2.2 | 9.7 | 17.8 | 15.1 | 14.1 | 22.2 | 13.5 | 4.3 |
| 10. Alertness | 1.1 | 8.6 | 13.4 | 13.4 | 8.5 | 10.2 | 12.8 | 15.0 | 17.1 |
| 11. General Tonus |  | 1.6 | 1.0 | 12.4 | 21.8 | 45.6 | 13.0 | 4.1 |  |
| 12. Motor Maturity | 2.6 | 14.5 | 9.8 | 21.2 | 28.0 | 16.1 | 6.2 | 1.0 | 0.5 |
| 13. Pull to Sit | 5.2 | 4.7 | 11.5 | 24.6 | 16.2 | 13.6 | 7.3 | 14.1 | 2.6 |
| 14. Cuddliness |  | 1.0 | 5.2 | 12.6 | 23.6 | 12.0 | 17.3 | 15.7 | 12.6 |
| 15. Defensive Movements | 1.1 | 3.7 | 4.7 | 1.1 | 6.8 | 18.9 | 30.5 | 32.6 | 0.5 |
| 16. Consolability | 0.6 | 3.9 | 1.1 | 0.6 | 11.1 | 10.0 | 1.7 | 68.3 | 2.8 |
| 17. Peak of Excitement | 0.5 |  | 2.1 | 7.3 | 25.5 | 21.4 | 31.8 | 10.9 | 0.5 |
| 18. Rapidity of Buildup | 4.1 | 6.7 | 13.0 | 7.8 | 25.9 | 29.5 | 8.3 | 4.1 | 0.5 |
| 19. Irritability | 5.2 | 7.8 | 15.6 | 17.2 | 20.8 | 18.2 | 9.4 | 5.2 | 0.5 |
| 20. Activity |  | 2.1 | 6.7 | 23.3 | 37.3 | 18.7 | 8.8 | 3.1 |  |
| 21. Tremulousness | 25.5 | 1.0 | 1.0 | 7.8 | 17.2 | 25.1 | 13.5 | 5.2 | 4.2 |
| 22. Startle | 1.6 | 15.0 | 14.0 | 13.0 | 10.4 | 14.0 | 29.0 | 1.6 | 1.6 |
| 23. Lability of Skin Color | 0.5 | 4.1 | 9.3 | 6.2 | 36.8 | 31.1 | 10.9 | 1.0 |  |
| 24. Lability of States | 14.1 | 28.8 | 23.0 | 18.3 | 7.9 | 3.7 | 2.6 | 1.0 | 0.5 |
| 25. Self Quieting Activity | 2.1 | 8.4 | 7.9 | 6.3 | 10.5 | 5.8 | 10.0 | 17.9 | 31.0 |
| 26. Hand Mouth Facility | 5.8 | 14.6 | 3.6 | 6.3 | 12.5 | 10.9 | 15.6 | 8.3 | 21.4 |

# APPENDIX 3.2

## SUMMARY AND DESCRIPTIVE STATISTICS FOR INFANT CHARACTERISTICS VARIABLES

| Source | Variable | Composition of Variable Set | Median | Range | N | Direction of Values |
|---|---|---|---|---|---|---|
| Brazelton Neonatal Assessment Scales (Newborn) | Deviant Behavior Score | Number of:<br>Scale items 1-26 scored as "deviant" (see text) | 1.0 | 0-7 | 193 | high=many deviant behaviors |
| | Alertness Score[1] | Sum of scores:<br>5. Orientation Inanimate Visual<br>7. Orientation Animate Visual<br>9. Orientation Visual & Auditory<br>10. Alertness | 4.3 | 4-12 | 183 | high=deviant alertness |
| | Irritability Score[1] | Sum of scores:<br>17. Peak of Excitement<br>18. Rapidity of Buildup<br>19. Irritability<br>24. Lability of States<br>25. Self-Quieting Activity | 5.3 | 5-12 | 186 | high=deviant irritability |
| | Habituation Score[1] | Sum of scores:<br>1. Decrement to Light<br>2. Decrement to Rattle<br>3. Decrement to Bell | 3.2 | 3-9 | 149 | high=deviant habituation |
| | Motor Score[1] | Sum of scores:<br>12. Motor Maturity<br>21. Tremulousness | 2.2 | 2-6 | 193 | high=deviant motor |
| | Neurological Suspicion Score | Number of:<br>Elicited Reflex items 1-20 scored as "abnormal" (see text) | 2.0 | 0-11 | 193 | high=many abnormal reflexes |

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[1] Scores are the sum of the items listed, where each item is scored 1= normal, 2= questionable, 3= deviant

## APPENDIX 3.3

## MULTISAMPLE FACTOR ANALYSIS OF THE BRAZELTON SCALE[1]

Milton E. Strauss
Daniel Rourke

### Subjects and Procedure:

We were fortunate in being able to obtain several hundred Brazelton Assessment Scale results from a number of laboratories for purposes of comparative study. In addition to two addicted (Ns = 71 & 74) and one non-addicted sample from Hutzel (N=53), we obtained 121 Caucasian, predominantly middle-class cases from Dr. Horowitz in Lawrence, Kansas, 179 cases from Dr. Vietze's prospective study of child abuse in Nashville, Tennessee, 140 lower class, black infants from Dr. Joy Osofsky at Temple University and Dr. Edward O'Connell at Syracuse University, 61 cases from Dr. Kay Standley's study of obstetric medication effects in Washington, D. C., and a total of 193 cases from Dr. Kathryn Barnard's Longitudinal study in Seattle, Washington. The latter sample is divided into two subsamples, one of high risk infants and the other infants of uncomplicated pregnancies and deliveries. The total number of cases is 892.

In collaboration with Dr. Daniel Rourke at Wayne State University, these data were studied using a multidimensional scaling technique, CANDECOMP. In brief, this procedure treats each sample as a single case and attempts to compute a set of orthogonal principal components which will maximally reproduce the inter-item correlations within each sample. It is more powerful than separate principal components analyses of each sample since it uses all of the data simultaneously and the solution is uniquely determined. Rotation of dimensions is typically not required for the dimensions to be psychologically meaningful; indeed, rotation degrades the solution. The analysis provides (1) a set of dimensions, (2) weights of each dimension in each sample, which are basically estimates of the importance of that dimension in accounting for the variance in each sample, and (3) an index of the goodness-of-fit of the general solution to each sample ($R^2$).

### Results and Discussion:

On the basis of our experience with the factor analysis of data from smaller samples, a 10 factor solution was extracted first, followed by 8, 6, and 4 dimension solutions. The 10 dimension solution accounted for 71.74% of the variance and the 8 dimension solution resulted in a drop of 5.6% in the proportion of variance accounted for. Reducing the dimension space by another 2 factors produced a much greater loss (10.3%). Since the 8 factor solution was minimally less powerful than the solution in 10 dimensions and was psychologically clearer, it was retained. The goodness-of-fit of this solution across samples ranged from $R^2 = .58$ to $R^2 = .71$ in the nonaddicted Hutzel and normal pregnancy Seattle samples, respectively. This is only a minor degree of between-sample differences in the adequacy of the solution, and the absolute levels are quite satisfactory given the variability in sample size and in amount of missing data in each sample. The correlation matrices were computed in whatever data were present (pair-wise deletion) and coefficients were thus based on different Ns. This introduces some unavoidable "wobble" into the system. The goodness-of-fit of the solution is significantly related to the size of the sample (Spearman's rho = .68, $p < .05$), which is not surprising, and indicates that larger samples produce more reliable numbers.

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[1] Taken from Final report to the Spencer Foundation, Early Development of Narcotics Addicted Infants, Milton E. Strauss, July 30, 1976.

The weights for each variable on each dimension, excepting Smiles and Skin-color changes which were excluded from the analysis, are presented in the table. The weights may be interpreted as factor loadings, although CANDECOMP loadings are always lower than those from principal components factor analysis. To aid in the interpretation of these dimensions, the following rules of thumb were developed prior to the analysis to identify "significant" loadings and these are underscored in the table:

1. The largest entry in each row is underlined. This assures that each item appears on at least one dimension, even if only weakly.
2. In any column with no large entry ($>.30$), underscore the largest loading. This assures that some item will appear on each dimension so that none will be unlabeled.
3. Underscore all loadings $> .30$

The dimensions are strikingly comparable to those found in more typical factor analytic studies. The first, and largest, is defined by responsiveness during alert periods. Interestingly, this seems to be a visual modality-specific factor, for responsiveness to the bell has but a small loading and responsiveness to the human voice is of borderline weight. Since the visual and visual-plus auditory items are administered in state 4 only, while the auditory items may be administered in state 4 or 5, the variability in loadings may be due to behavior state condition differences.

The second dimension is defined principally by indices of arousability (peak state, rapidity of build-up of excitability, extent or irritability), activity level in alert states and muscle tone. Pull-to-sit, which is also basically a measure of muscle tone and control, does not load strongly on any dimension, but is more prominent here than on other factors. This second dimension, and the third which is marked solely by items assessing response decrements to distal stimuli during sleep, have been found in other factor analyses of the Scale as well. The third factor is quite small, accounting for only a bit more than 5% of the variance. The first two factors alone account for 44.5% of the variance, or over 2/3 of the variance associated with all 8 dimensions.

In part because of their small size, the other factors are at times more difficult to interpret. Dimension IV is less clearly meaningful than V. This latter factor appears best characterized as a CNS irritation or

## Appendix 3.3, page 3

### Brazelton Dimension Matrix

| Variable | Dimension I | II | III | IV | V | VI | VII | VIII |
|---|---|---|---|---|---|---|---|---|
| Response decrement: light | 09 | 03 | *39* | -04 | 22 | -07 | 00 | -08 |
| Response decrement: rattle | 09 | 07 | *50* | -16 | 24 | -02 | 11 | 02 |
| Response decrement: bell | 10 | 10 | *52* | -08 | 23 | -10 | 13 | 03 |
| Response decrement: pinprick | 10 | 04 | 13 | -07 | -03 | 22 | *-51* | *-47* |
| Orientation: ball | *30* | -22 | -09 | 05 | 15 | -01 | 13 | 14 |
| Orientation: rattle | 22 | -17 | -15 | 00 | 23 | -06 | *-31* | -13 |
| Orientation: face | *33* | -21 | -10 | 13 | 07 | 00 | 24 | 05 |
| Orientation: voice | *29* | -22 | -16 | 03 | 19 | 03 | -13 | -09 |
| Orientation: face and voice | *34* | -21 | -09 | 10 | 17 | -01 | 24 | 00 |
| Alertness | *37* | -16 | -14 | -03 | 09 | 16 | 10 | 00 |
| General tonus | -07 | *-31* | 06 | -29 | 02 | 29 | 05 | 06 |
| Motor maturity | 20 | 00 | 18 | *32* | -29 | 06 | -02 | 32 |
| Pull-to-sit | 01 | *-26* | 18 | -09 | -16 | 21 | 03 | 14 |
| Cuddliness | 14 | -17 | 14 | -11 | -02 | -06 | *-34* | -02 |
| Defensive movement | 00 | -18 | 08 | -13 | *-33* | 10 | -04 | 16 |
| Consolability | 11 | 10 | -04 | -16 | -03 | -21 | *-52* | *45* |
| Peak of excitement | -26 | *-36* | 14 | 19 | 03 | -09 | 03 | -14 |
| Rapidity of buildup | -21 | *-30* | -01 | 18 | 07 | *-36* | -05 | 10 |
| Irritability | -26 | *-32* | 10 | 21 | 02 | -21 | -04 | 00 |
| Activity | -12 | *-32* | 08 | -27 | -03 | 11 | 06 | 14 |
| Tremulousness | -18 | -06 | -21 | -27 | *39* | -10 | 06 | -22 |
| Startles | -12 | 04 | -16 | -29 | *33* | -03 | -06 | *46* |
| Lability of state | -15 | -25 | 12 | 25 | 08 | *-40* | -09 | 00 |
| Self quieting | 19 | 09 | -06 | *-31* | -25 | *-48* | 13 | -09 |
| Hand-mouth facility | 03 | -07 | 02 | *-43* | *-36* | *-34* | 14 | -23 |
| %Total Variance | 27.7 | 16.8 | 5.6 | 4.5 | 3.5 | 3.4 | 2.5 | 2.2 |

Note: Decimal points omitted

See text for explanation of italics

immaturity dimension, and is defined by tremulousness, startles, poor hand-mouth coordination and nonspecific motor activity as a defensive reaction. The former is characterized by mature motor movements, poor self-quieting ability and limited hand-mouth coordination facility. This pattern makes little sense, for one would expect the coordinated activity required for hand-mouth insertions to load positively on the same dimension as maturity of motor movements. At this time, we cannot account for this pattern. One possibility being evaluated is that it is due to peculiarities introduced into the correlation matrix by missing data for some items.

Variation across items within samples on the number of missing scores is generally a serious problem in the factor analytic study of this instrument, for the meaning of missing data varies as a function of the specific item. For example, no score on an orientation item means that the behavior could not be elicited, typically because the infant could not be maintained in the appropriate state No score on self-quieting, on the other hand, means that the infant did not become sufficiently irritable for this behavior to be emitted. Even eight is a large number of dimensions to account for 25 variables, and the smaller ones, beginning with the fourth, are perhaps being defined more by patterns of missing scores than by distributions of present scores. To minimize the risk of over-interpreting the results, we plan to factor analyze the data for those infants in which the examination is completely separate, and to also look separately at those cases where specific clusters of scores are missing. In these analyses, the distributions of each sample will be standardized to mean = 0, standard duration = 1 and the data from different laboratories will be pooled. This pooling is appropriate because of the fairly similar degrees of goodness-of-fit of the CANDECOMP solution to all of the samples.

The variation in dimension weights across samples has not as yet been carefully examined. As was indicated earlier, these weights may be interpreted as indicators of the relative importance of the dimensions in accounting for the inter-item correlations in each sample. In collaboration with Dr. Rourke, an approach to the analysis of dimension weight variation has recently been formulated. In brief, the questions to which these analyses are addressed are: (1) Which dimensions have the most disparate weights across samples? (2) Can a model--a metric multidimensional space--be constructed to order the groups in terms of patterns of dimension weights? (3) What sample variables, e. g., socio-economic status, age, and birthweight distributions, are associated with the greatest dimension weight variation and with the location of groups in a multidimensional dimension weight space?

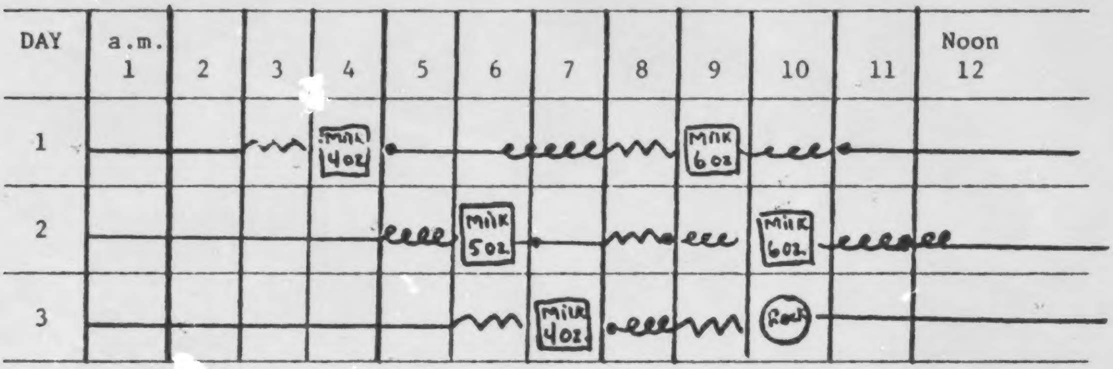
These analyses are about to be conducted now that a mode of approach is explicitly formulated, programming problems have been solved, and computing funds have been made available by Wayne State and Johns Hopkins Universities. We anticipate that these additional factor analytic and dimension weight studies will help to clarify a number of points about the Brazelton Neonatal Behavioral Assessment Scale. These include the characterization of dimensions of neonatal behavior which are most adequately measured, the identification of behavior dimensions the measurement of which needs to be modified, and the specification of some of the correlates of neonatal behavioral variability.

At the beginning of this research program, the Brazelton Neonatal Assessment Scale was used to understand differences between groups of infants. At its end, the characteristics of groups of infants are being used to help understand the Scale. The studies of addicted and nonaddicted infants with the Scale have shown its descriptive utility and, in the context of the mother-infant interaction study, its potential utility for understanding the development of individuality during early infancy. The studies of the instrument itself, we would hope, will help to better our means of conceptualizing and measuring psychological individuality early in life and our understanding of their changes during development.

# APPENDIX 3.4

We believe parents are good at observing their child's growth and development. As part of our program, we ask parents for their observations and ideas about their baby. We are especially interested in your observations and ideas about what your baby is like at this age. From our experience with other parents, we know you will enjoy learning more about your baby through your observations and recordings.

We have enclosed a few questions for you to answer about your baby and a special sleep-activity record for you to complete. The sleep-activity record is for you to keep a daily diary of your baby's sleep and awake activities for one week. It is fairly easy to keep this record. The following is an example of symbols to use in completing the record.



When the questions and record are completed, please mail it to us in the enclosed self-addressed stamped envelope. We will review your observations and contact you regarding our impressions of how things seem to be going for you and discuss any questions you may have at that time.

Thank you very much for your assistance. Please call                if you have any questions.

APPENDIX 3.4 (continued)

OFFICE USE ONLY

Code #______

## SLEEP-ACTIVITY RECORD

Parent's Name ______________________ Last First

Child's Name ______________________ Last First

Parent's Usual Bedtime ______________________ Mother Father

Child's Place of Sleep ______________________

Date of Record ______________________ Beginning End

Parent's Usual Awakening ______________________ Mother Father

| DAY | a.m. 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | Noon 12 | p.m. 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | M.N. 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | | | |

SYMBOLS: Sleep ______________

Awake (crying or unhappy) ∧∧∧∧

Awake (content, happy) ℓℓℓℓℓℓ

Feeding (what and how much) □

Parent-child activities, i.e., rocking, holding, playing, car ride ○

Diaper Change ●

## APPENDIX 3.5

## SUMMARY OF VARIABLES FROM SLEEP-ACTIVITY RECORD

| Source | Variable | Composition of Variable Set | Direction of Values |
|---|---|---|---|
| Sleep-Activity Record (1,4,8,12 months) | Feedings per Day | Average score: computed from number of feedings on 7-day record | high=many feedings/day |
| | Regularity of Feedings | Percentage score: computed from number of feedings at same hour at least 5 out of 7 days | high=more regular feeding schedule |
| | Longest Night Sleep | Individual score: length in hours of longest night sleep on 7-day record | high=long night sleep-segment |
| | Regularity of Night Sleep | Percentage score: computed from number of hour-segments infant sleeps at same time 5 of 7 nights | high=more regular night sleep |
| | Longest Day Sleep | Individual score: length in hours of longest day sleep on 7-day record | high=long day sleep-segment |
| | Regularity of Day Sleep | Percentage score: computed from number of hour-segments infant sleeps at same time 5 of 7 days | high=more regular day sleep |
| | Regularity of All Sleep | Percentage score: computed from number of hour-segments infant sleeps at same time 5 of 7 24-hr segments | high=more regular sleep |
| | Night Awakenings | Average score: computed from number of awakenings after mother's usual bedtime on 7-day record | high=many night awakenings |

## Appendix 3.6

## CORRELATIONS AMONG VARIABLES FROM SLEEP-ACTIVITY RECORD AT ONE MONTH

| One Month | Regularity of Feedings | Longest Night of Sleep | Regularity of Night Sleep | Longest Day Sleep | Regularity of Day Sleep | Regularity of All Sleep | Night Awakenings |
|---|---|---|---|---|---|---|---|
| Feedings per day | .00 | -.20* | -.15* | -.21* | -.21* | -.18* | .24* |
| Regularity of feedings | | .06 | .07 | -.06 | .02 | .06 | -.14* |
| Longest night sleep | | | .38* | .04 | -.10* | .24* | -.49* |
| Regularity of night sleep | | | | .09* | -.05 | .22* | -.37* |
| Longest day sleep | | | | | .19* | .12* | -.05 |
| Regularity of day sleep | | | | | | .41* | .04 |
| Regularity of all sleep | | | | | | | -.20* |

*Kendall Correlation Coefficients: $p < .05$; N = 161.

A=28, E=1.4, O=18.

Appendix 3.7

## CORRELATIONS AMONG VARIABLES FROM SLEEP-ACTIVITY RECORD AT FOUR MONTHS

| Four Months | Regularity of Feedings | Longest Night of Sleep | Regularity of Night Sleep | Longest Day Sleep | Regularity of Day Sleep | Regularity of All Sleep | Night Awakenings |
|---|---|---|---|---|---|---|---|
| Feedings per day | .17* | -.26* | -.28* | -.11* | -.03 | -.24* | .30* |
| Regularity of feedings | | .12* | .07 | .00 | .19* | .20* | -.18* |
| Longest night sleep | | | .44* | -.03 | -.01 | .44* | -.45* |
| Regularity of night sleep | | | | .04 | .06 | .32* | -.43* |
| Longest day sleep | | | | | .25* | .06 | .02 |
| Regularity of day sleep | | | | | | .45* | -.01 |
| Regularity of all sleep | | | | | | | -.30* |

*Kendall Correlation Coefficients; $p < .05$; N = 139
A=28, E=1.4, O=18.

Appendix 3.8

## CORRELATIONS AMONG VARIABLES FROM SLEEP-ACTIVITY RECORD AT EIGHT MONTHS

| Eight Months | Regularity of Feedings | Longest Night of Sleep | Regularity of Night Sleep | Longest Day Sleep | Regularity of Day Sleep | Regularity of All Sleep | Night Awakenings |
|---|---|---|---|---|---|---|---|
| Feedings per day | -.30* | -.31* | -.24* | -.16* | -.16* | -.33* | .24* |
| Regularity of feedings | | .14* | .19* | -.05 | .24* | .34* | -.28* |
| Longest night sleep | | | .29* | .04 | .05 | .43* | -.38* |
| Regularity of night sleep | | | | .13* | .08 | .36* | -.32* |
| Longest day sleep | | | | | .23* | .08 | .00 |
| Regularity of day sleep | | | | | | .53* | -.11* |
| Regularity of all sleep | | | | | | | -.31* |

*Kendall Correlation Coefficients; $p < .05$; N = 130
A=28, E=1.4, O=22.

## Appendix 3.9

## CORRELATIONS AMONG VARIABLES FROM SLEEP ACTIVITY RECORD AT TWELVE MONTHS

| Twelve Months | Regularity of Feedings | Longest Night of Sleep | Regularity of Night Sleep | Longest Day Sleep | Regularity of Day Sleep | Regularity of All Sleep | Night Awakenings |
|---|---|---|---|---|---|---|---|
| Feedings per day | -.31* | .19* | -.13* | -.18* | -.10 | -.20* | .12* |
| Regularity of feedings | | .14* | .15* | -.02 | .17* | .25* | -.18* |
| Longest night sleep | | | .33* | .18* | .10 | .42* | -.44* |
| Regularity of night sleep | | | | .11* | .20* | .24* | -.31* |
| Longest day sleep | | | | | .16* | .16* | -.19* |
| Regularity of day sleep | | | | | | .56* | -.16* |
| Regularity of all sleep | | | | | | | -.35* |

*Kendall Correlation Coefficients: $p < .05$; N = 112

A=28, E=1.4, O=25.

# CHAPTER 4

# INSTRUMENTATION AND FINDINGS: THE ENVIRONMENT

## OVERVIEW

The literature review produced extensive evidence about the role the infant's environment plays in all areas of his development. The works of Bowlby, Hebb, and others in the 1950s called attention to the importance of children's early environments. Perceptual deprivation and the need for early perceptual experiences as bases for later learning ability were the foci for research in that period. More recently longitudinal research has emphasized the way the environment of childhood can drastically modify the effects of initial physical or developmental status. That is, premature youngsters or those with low scores on developmental tests in infancy exhibit different long-term developmental outcomes depending on the type of home in which they are raised.

All the evidence, past and current, points to the importance of being able to evaluate the developmental environment. In essence, the environment includes all experiences encountered by the child: people, objects, places, sounds, visual and tactile sensations. Yet simply talking about "the environment" sounds much too global. How can the relevant forces within the environment be conceptualized and classified so they can be operationalized in child screening and assessment?

Several conceptual systems have been suggested. The most workable one is that offered by Yarrow and his associates (Yarrow *et al.*, 1975). They distinguish between the "animate" and the "inanimate" environments. The inanimate environment refers to the objects available to the child for exploration and manipulation. The animate environment includes the activities of the caretaker used in arousing and directing the young child to the external world.

Obviously the animate and inanimate environments overlap somewhat, since the caretaker may provide inanimate stimulation as part of an effort to evoke response or learning from the child. In such a circumstance, Yarrow considers that the stimulation, since it originated from the caretaker, is primarily animate. In essence, then, animate stimulation covers all experiences the child encounters coming directly from the caretaker (or from other people). Inanimate stimulation covers the characteristics of the physical world itself: the richness and variety of experience available to the child when the caretaker is not present or does not provide the stimulation. In considering the environment as it influences child development, the availability of appropriate stimuli is only part of the picture; the other part is the interaction with the available environment. It cannot be overemphasized that the nature of the child's environment and the quality of the "give and take" he has with it are both essential ingredients in the developmental process. We also believe, based on available evidence, that it is essential to achieving predictive evaluation, i.e., the ability to identify precursors of developmental problems.

Since relationships between people are not unidirectional, the importance of interactional exchange is particularly pertinent to the animate environment. Each of the participants brings to the interaction habits, emotional patterns, or individual reaction tendencies. The mix of the two sets of habits and patterns in turn affects the behavior of each, until the two work out together a new set of patterns and habits. The child responds to what is done and offered, and that response in turn affects the way in which adults approach the child in the future (Kennedy, 1973; Thoman, 1975). The child, too, initiates interactions by demanding care or attention, or even by being quiescent. The most recent literature (Klaus, 1972) has emphasized the importance of very early mother-infant interaction, i.e., immediately after birth, in establishing "bonding" or "attachment."

Chapter 3 considered some of the characteristics of infants and the variability which is evident as early as the newborn period. Other research has also shown that as early as the first day of life there are differences among babies on dimensions such as visual alertness, soothability, intensity of drives, and other aspects of temperament. The infant brings these characteristics to interaction with the environment, and these already established behavior patterns influence the response he elicits.

The mother[1] also brings a host of already existing behavior patterns to her interaction with her child. Her personality, her attitudes toward life and toward her baby, the degree of turmoil in her life, her health, and her expectations of the infant also enter into how she approaches interaction with her child. Because of their importance, maternal perceptions and life circumstances are treated in separate chapters.

One of the characteristics which has had the most research attention in mother-child interaction is education or socioeconomic status. For example, middle-class mothers tend to give rationales more often with their instructions to their child, use more praise, orient the child to a task with more care, and give more helpful specific feedback to the child about the correctness of his actions. Less well-educated mothers more often use what Hess and Shipman have called an "imperative" style, in which the mother controls the child's behavior through appeals to social norms or to power and authority ("You'll do that because I say so," or "Teachers don't like children who do that.") Mothers with more education are more likely to use either the "personal-subjective" style, in which the mother appeals to feelings, preferences, or personal considerations (e.g., "You hurt your sister's feelings when you say things like that") or a "cognitive-rational" style, in which the mother shows the consequences of the child's actions or emphasizes a long-term goal or gain, or explains the reasons for a rule or a demand.

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[1] When we use the term "mother-child interaction" it is not to imply that the mother is the only critical adult. All caretakers and all other adults are important, though the mother is usually the most frequent, and hence the most crucial one.

Although most of the research on maternal interactional styles has been done with preschool age children, there is evidence that mothers as they interact with their infants as young as 9 months of age show the same types of differences. Better educated mothers use more praise, less criticism, and more careful orientation of the infant to the task. In most instances we do not know whether the mother's style and assumptions about the child were present even before the birth of the child, or whether her style of interaction developed as a result of her encounters with the child after birth. It's hard to believe that it could be the latter, however, since there is very little indication that the infants born to less well-educated mothers tend to differ as a group from those born to better educated mothers. Individual infants bring their own response tendencies; the infants of the less educated mothers as a group are not similar. All of this makes more tenable the assertion that the well- and poorly-educated mothers differ from the very start in style of interaction, control techniques, and assumptions about children's capabilities.

Studies which examine maternal behavior patterns more deeply do provide potential explanations for the consistent relationships between demographic variables, such as education, and developmental outcomes. They provide increased insights into possible care activities which can optimize that interaction between children and their environments often lacking in the more global relationships with social class factors. But, even if etiological interaction behaviors are defined, is it realistic to anticipate changing them?

Many attempts have been made to change maternal behavior and assess the subsequent effects on the child. These have largely been with preschool children and have focused on improving cognitive functioning. Experimental conditions such as using "toy demonstrators" who visit the home and show the mother how to provide a variety of stimulation, or bringing mothers together in groups for similar instruction, have resulted in higher child IQs. While these studies do not indicate which maternal behaviors are critical or which ones changed to produce the effect, they are valuable through offering evidence that interaction patterns are somewhat maleable.

Other types of research have provided more specific evidence about the characteristics of the environment, both animate and inanimate, which are important for healthy child development. Relevant animal studies have focused on the effects of stimulus deprivation while varying the amount of stimulation. Certain points of summary from the animal literature on the rat seem germane: a) some basic minimum amount of handling stimulation is required during early infancy to stimulate the growth of the endocrine system; b) the effect of handling is much greater during the neonatal period (equivalent to the first month of human life); c) rearing in a restricted stimulus environment affects later learning ability and the positive impact of an enriched environment is greater when exposure occurs immediately after weaning. So both the amount and the timing of environmental stimulation may be of particular importance.

Studies of institutionalized children provide grounds for generalizing the effects of varied amounts of environmental stimulation to humans. Attentional behaviors, such as visually directed reaching, have been observed to occur more rapidly for infants provided with extra visual and tactile stimulation. Other findings have strongly suggested that it is possible to overdo the amount of stimulation; providing "massive enrichment," exposure to frequent high decibel noise, and a high level of activity in the home have been related to negative cognitive and physical outcomes for children. From this evidence we may conclude that the total amount of stimulation does matter, but that we are dealing with a continuum in which optimum levels of stimulation lie in the middle. Either too much or too little stimulation can be detrimental.

For the inanimate environment, Yarrow, Rubenstein, Pedersen and Jankowski (1972) have offered what seemed to us to be a more fruitful approach than simply considering the amount of stimulation. They use three dimensions: (1) variety: the number of different objects available to the child, (2) responsiveness: an index of the feedback potential inherent in objects, and (3) complexity: the extent to which objects provide information through various modalities. Clearly, it is possible for one home environment to be high in variety, but low in responsiveness or complexity; another may be high in complexity, but low in variety.

Other investigators have devised methods for assessing the quality of the home environment which include both animate and inanimate stimulation (e.g., Caldwell, 1971). While the methods of classifying the environmental dimensions differ across investigators, the collective findings in relation to child developmental outcomes reiterate the value of environmental assessment as a major emphasis of this project.

As we approached the instrumentation of the environmental assessment, we had several aims:

a) To include both the animate and inanimate environments.

b) To structure the methods tested enough to take advantage of classifications in previous studies, yet to be flexible enough for meaningful modification based on the findings.

c) To test different techniques in order to determine those most efficient for the purpose.

d) To place major emphasis on feasible assessment of maternal-child interaction including maternal behaviors, infant behaviors, and the ability to identify evolving reciprocal patterns of the two.

In this chapter, maternal-child interaction will be discussed first. A general inventory of home stimulation is presented next, followed by miscellaneous measures of specific aspects of the inanimate environment.

A summary of all the environmental variables is given in Appendix 4.1. For easy reference it shows the basic composition of the variables and the meaning of the direction of the scores.

## INSTRUMENTATION FOR MATERNAL-CHILD INTERACTION

In evaluating this important area we did not want to rely on responses to questioning, that is, on the mother's perception of the maternal-infant relationship. We wanted a more direct means of measurement. Since the variables of interest were behavioral, this meant utilizing an observational technique. Yet behavioral observation presents certain pitfalls, especially as it relies on observer interpretation. Other investigators currently studying maternal-infant interaction attack this problem by taking large samples of behavior (several hours or days) which require extensive personnel resources and use lengthy, exhaustive behavioral codes. Obviously this was not an option open to us in developing methods for use in care settings. An alternative to complicated behavioral counts was necessary. In giving up the structure of more complex information-gathering methods, we realized that the training and perspective of the observer plays a proportionately greater role in the quality of the data. This problem did not seem insurmountable, however, since we already knew that a substantial orienting educational component would be required if the methods developed were truly to bring something new to traditional assessment practices. We also realized that inter-rater reliability would be an important aspect of testing the methods.

In developing the scales for rating maternal-infant interaction, we utilized the help of consultants from different parts of the country who had gained experience through their own related studies. The decision was made to develop scales for two different types of interaction: a) an episode during which the mother would teach the infant a task, and b) a feeding session during which the mother would follow the routine she typically used for the current age of the child.

Defining the feeding and teaching episodes for observation offered several advantages. These are easily identifiable units, for each episode has a beginning and an end. Such units, moreover, having been used in earlier studies, gave us a chance to build upon the findings of previous observers. All in all, they offered the best possible material from which to learn about the earliest signs of the child's individual characteristics, the mother's response to him, and the developing interaction between the two. They helped us work toward answers to such questions as these: What contributes to a normal, healthy mother-infant relationship? What part does the mother play, and what part does the infant play? Given the child's individual biological and environmental differences, what kind of reciprocal interaction takes place? We hope ultimately to identify interactive patterns in the first year of life which will be of predictive value and will suggest beneficial preventive care alternatives.

The feeding situation plays a central role in the early association between mother and child, and the opinion has been expressed (Brody, 1956) that behavior during feeding serves as a model of the mother's overall behavior toward her infant. Gesell (1937, p.6) concluded that "the feeding behavior of the infant is perhaps the most inclusive and informative single indicator of his personality." The feeding situation is a very natural one in which to assess communication, bonding, and the responsivenss of the mother and infant to each other.

The teaching process shares some of the same advantages but focuses more on the mother's style of stimulating the infant to learn. Since it requires less time to observe than an entire feeding, it is more feasible. In addition it is more flexible as to the timing, in that one doesn't have to work around a feeding schedule. While teaching is not as natural a situation as the routine feeding, it does tap orientation toward achievement and the infant's response.

First, the conceptual categories or dimensions to be measured were outlined. Then for each category, items were designed with defined scale points.

Teaching

Ratings of the teaching task (Appendix 4.2) consist of 24 five-point scales, 15 referring to the mother and 9 to the infant. They were designed to cover several important aspects of behavior:

- Initial state of infant: the circumstances with which the mother has to work when she starts teaching her infant a task.
- Teaching style: the mother's strategies such as modeling, physical guidance or forcing, her timing, and sensitivity to the infant.
- Affect: the mother's comfort and the infant's pleasure or displeasure.
- Responsiveness: the type of feedback the mother gives, the infant's involvement, e.g., the intensity and duration of his attention, and other responses such as vocalization.
- Management: the mother's ways of facilitating the child's performance through positioning the infant and the materials.

The general purpose is to observe how the mother structures the learning situation, how the infant responds, and the type of feedback the mother provides. As in studies of older children, the reason for observing mothers and infants during the teaching situation is to explore the ways in which mothers and children relate to one another in teaching and learning situations, to see whether those relationships are connected in any way to the child's later functioning in school and in other intellectual tasks. So far there has been no comprehensive study which describes maternal-infant teaching interaction as early as infancy, shows changes during longitudinal developmental stages, and examines relationships to developmental outcomes.

Six of the scales involve interactive behaviors, i.e., behaviors of either mother or infant which are in part dependent upon the behaviors of the other member of the pair. The remaining 18 scales are considered descriptive of ongoing behaviors and focus only upon one member of the pair. Most of the scales are based upon implicit frequency counts, such as "never," "less than half the time," etc., with low ratings meaning little of the behavior and high ratings indicating a great deal. A few items have alternatives which differ qualitatively from each other. The items differ in the scope of the behaviors they measure; for example, contingent positive feedback involves specific behaviors, while sensitivity is a more global rating of the mother's style of interacting with the child. All items are scored after the completion of the teaching task.

The mother is asked to teach her child two tasks. They are adapted from the Bayley scales: one is appropriate at the age plus .5 months level (easy) and the other is 1.5 to 2.5 months in advance of the age level (hard).

Observation of the teaching process was made in the home when the infant was 1 month, 4 months, 8 months, and 12 months old. If both mother and father and/or another caretaker were present at the time of the home visit, the choice of which caretaker was to do the teaching task with the baby was based on which person cared for the child more than 60% of the time. The home visitor presented the tasks in succession at the time when the infant was alert and the caretaker's attention to the infant was appropriate. Occasions arose when the tasks were interspersed with the maternal interview. If a task was interrupted for any reason, diaper change, telephone, etc., an alternate task was given to the mother to teach the baby. The length of time spent on each task was determined by the mother. The home visitor instructed the mother as follows:

> I have two tasks I would like you to help________to learn. You can do this in any way that you like. You may position__________ in any way that you like and take as much time as you wish. Just let me know when you are finished with the first task and then I will take a few notes and give you the second task.

Following the task that was in advance of the infant's age, reassurance was offered, such as: "You both did very well. The second task was in advance of your infant's age."

At the completion of each task the home visitor would rate the maternal and infant behaviors that occurred; a manual and score sheet were used.

Table 4.1 shows the length of time mothers used to teach the tasks at the different ages. As has been stated, the mothers themselves made the decision about the length of the observation. Some persisted longer than others in trying to achieve success, and some continued to try for more than one successful task completion. In general, the harder task was longer, but, with few exceptions, the maximum length for either task was less than seven minutes. On the average the observer time required for this assessment ranged from about one to three minutes.

Since the interaction scales represent the first attempt to rate behaviors in these types of situations, the staff spent considerable time in sessions aimed at clarifying the scale items and increasing observational skills of the home visitors prior to the start of the study. An item analysis of inter-rater reliability prior to January, 1974, provided direction for which items needed clarification. Throughout the home data collection, dual observations were made which permit interobserver reliability analysis. Observations using interaction scales were also made for the special cohort families and videotaped at the Child Development and Mental Retardation Center. This permits reliability checks on the behaviors over time. While other effects are not held constant, e.g., the natural home environment versus the bright lights required for filming, we thought it important to see whether these observations could be made in a setting strange to the mother and infant. This opportunity to videotape also provided a record of earlier

## TABLE 4.1

## DISTRIBUTION OF SUBJECTS BY LENGTH OF TEACHING OBSERVATIONS

| Age and Task | Length of observation (minutes) | | | | | | | | Mean | Median |
|---|---|---|---|---|---|---|---|---|---|---|
| | < 1 | 1 | 2 | 3 | 4 | 5-7 | 8-10 | 12-15 | | |
| 1 Month<br>N=193 | | | | | | | | | | |
| Task I | 100 | 25 | 29 | 13 | 6 | 19 | 0 | 1 | 2.8 | 2.2 |
| Task II | 113 | 17 | 23 | 15 | 6 | 17 | 2 | 0 | 3.1 | 2.5 |
| 4 Months<br>N=174 | | | | | | | | | | |
| Task I | 29 | 70 | 45 | 16 | 3 | 11 | 1 | 0 | 1.0 | 1.6 |
| Task II | 35 | 49 | 36 | 25 | 13 | 12 | 4 | 0 | 2.5 | 2.1 |
| 8 Months<br>N=162 | | | | | | | | | | |
| Task I | 8 | 103 | 28 | 15 | 4 | 3 | 1 | 0 | 1.6 | 1.2 |
| Task II | 16 | 46 | 64 | 22 | 10 | 2 | 1 | 1 | 2.2 | 1.9 |
| 12 Months<br>N=159 | | | | | | | | | | |
| Task I | 4 | 64 | 55 | 20 | 6 | 8 | 1 | 1 | 2.1 | 1.7 |
| Task II | 8 | 33 | 65 | 29 | 3 | 14 | 4 | 3 | 2.7 | 2.2 |

behavior should it be helpful in later revision of the scoring methods. The reliability findings are discussed later in this chapter.

The variability of the items for the newly developed instruments was of major interest. Criteria for eventual revision or refinement to improve variability were defined: 1) all scale points should be used once, preferably four or five times, 2) no scale point should include more than 50 percent of all subjects except when scale points mean none or never, 3) no two scale points at the extremes should include more than 60 percent of the subjects except when these scale points mean none. The distributions show that not all of the teaching scale items meet these criteria; there are several alternative reasons which might explain why. The variability may be a function of the age of the child (e.g., differences of intensity between 1 and 4 months), of a lack of heterogeneity in the population studied, of a floor or ceiling effect, of observer preference for certain scale points, or of the actual limitation of meaning built into the scales. This first longitudinal experience using the scales will be helpful in highlighting revisions needed, especially in terms of predictive validity. There will also be a need, however, for further empirical testing, particularly with different and more diverse populations.

An overview of the distributions for the teaching items shows that they conform to what one might expect developmentally on the part of the infants.[1] At 1 month they tended to be moderately interested in the task, somewhat alert, with very little, if any, vocalizing. Their activity was at a minimum--confined to head and arm movement. Similar behaviors occurred with the more difficult task, although the babies were less likely to be successful with this task.

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[1] Appendix 4.3 shows the distributions of infants and mothers by the items and values of the teaching scales. The distributions are presented in percentages so comparisons can be made more easily across time points when subject Ns vary. Scale points are from low "1" to high amounts of behavior, "5" with the exception of displeasure which is in the opposite direction, 5=no displeasure and 1=a lot of displeasure.

With increasing age there was more consistency in the infant behaviors and so less variability of scale values. For example, on the easy task, in contrast to 1 month, the infants tested at 4, 8, and 12 months were more alert; they focused on the task for greater lengths of time with more intensity. More responded to mothers' task-help, as well as vocalizing more and having greater success in completing the task. We would expect such changes to occur on the basis of developmental processes. At the older ages the child is capable of much longer periods of alertness, actively exploring his environment visually or motorically. His relationship to his mother has been defined by 4 months of age as his energies are more directed to his external environment.

The distributions of maternal behaviors on the teaching tasks provide interesting insights. Mothers of 1-month-old infants provided positive feedback for their infants' efforts more frequently on the easy task than on the hard. Mothers at 1 month were still learning about their infants' needs and cues in the teaching situation and therefore did not position the infant, manage the materials, or time the presentation of the task as well as when their children were older. They also used a variety of techniques to assist their infants' learning, such as forcing and physically guiding the infant to complete the task. With the more difficult task at this age mothers were less positive, perhaps because the infants were less successful or because the harder task was more of a challenge for the mother to teach. The mothers used fewer techniques to assist the infants to learn the hard task; as seems logical, they mainly used physical guidance.

By 4 months (on the easy task) mothers seemed to be more aware of their infants' needs, for they managed the babies' positions and materials better. Their timing and sensitivity improved, and praise outweighed discouragement. Again, on the more difficult task praise or positive feedback was less frequent.

On the 8 and 12 month easy task mothers tended to use less positive feedback than at 1 and 4 months; the only point where negative feedback exceeded positive, however, was on the 8 month hard task. The 8 month hard task also showed other differences: mothers used more forcing, guiding, or demonstrating; their timing and sensitivity was less in tune with the infants; and they allowed little exploratory behavior. These differences may be accounted for in part by the fact that many changes had taken place developmentally. The infants had become far more mobile, explored more with their hands and mouth, and were less able to be involved in an activity for any length of time. The differences may also be accounted for, however, by the specific hard task at 8 months, i.e., drawing a line with a crayon. Many mothers understandably did not feel free to permit mouthing of the crayon and did not want marks elsewhere than on the paper provided.

Data Reduction for the Teaching Scales. As described earlier, the teaching scales originally consisted of 24 items, 15 maternal and 9 infant behaviors that were scored on a five-point scale. The 24 items were developed to reflect theoretical categories from the literature, but in this developmental stage we did not want to make assumptions about the underlying dimensions if they could be tested empirically. We also wanted the systematic assessment to be as reliable a picture of teaching behavior as possible; the reliability would undoubtedly be enhanced if the items were used in some composite form rather than singly.

Our first step in data reduction was to examine correlations between items. The impressions for feasible groupings of items were then reinforced by factor analysis (SPSS varimax orthogonal rotation method). We considered loadings on all factors at a fairly high criterion level at this preliminary stage.[1] We realized that these factor analysis findings should not be accepted as finally definitive in the development of this instrument; the lack of variability on some items and the particular nature of our population would influence the results. This was a helpful first step, however, in looking at covariance between items at the different time points, and at the patterns across time points.

Using both the factor analysis and our conceptual base developed earlier, we defined variable sets for the teaching scale. We wanted these sets to be clinically useful in describing strengths and weaknesses in the interactive behavior. We also wanted them to be amenable to professional education for better understanding of mother-infant interaction. These are shown in Table 4.2 for the easy task and in Table 4.3 for the hard task, along with the number of the factor on which each item loaded. For example, at 1 month, items 3, 6, 7, and 9 loaded on the first factor for the easy task. These are all infant items, and "readiness to learn" seemed to best describe this set of behaviors. At 1 month, items that loaded on factor two included "positive feedback" and "affection," which comprise the set "positive messages." Along with these another item, "verbal style," also loaded; it did not, however, make good conceptual sense to place it with the others in "positive messages." There were other items which did not load or did not fit the conceptual sets

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[1] The factor loadings are shown in Appendix 4.4.

## TABLE 4.2

## TEACHING OBSERVATION - EASY TASK
## NUMBER OF FACTOR POSITION ON WHICH ITEMS LOAD* BY SUBJECT AGE

| Items and Clusters | 1 month | 4 months | 8 months | 12 months |
|---|---|---|---|---|
| MATERNAL | | | | |
| POSITIVE MESSAGES | | | | |
| 10. Positive Feedback | 2 | 2 | 2 | 3 |
| 23. Affection | 2 | 2 | 2 | 3 |
| NEGATIVE MESSAGES | | | | |
| 11. Negative Feedback | 6 | 4 | 5 | 4 |
| 24. Disapproval | 6 | 4 | | |
| TECHNIQUES | | | | |
| 12. Modeling | 7 | 6 | | 8 |
| 15. Directions | 4 | | | 4 |
| 16. Forcing | | | 7 | |
| 17. Physical Guidance | 4 | | 7 | 5 |
| FACILITATION | | | | |
| 13. Management of Materials | 5 | 5 | 3 | 2 |
| 14. Positioning Infant | 5 | 5 | 3 | 2 |
| 18. Timing | 5 | 1 5 | | |
| 21. Sensitivity | 5 | 5 | | |
| INFANT | | | | |
| READINESS TO LEARN | | | | |
| 3. Attentiveness Task-Help | 1 | 1 | 1 | 1 |
| 6. Intensity Involvement | 1 | 1 3 | 1 | 7 |
| 7. Duration Involvement | 1 | 1 | 1 6 | 1 |
| 9. Alertness | 1 | 1 3 | 4 | 7 |
| INDEX SCORES OF INTEREST | | | | |
| MATERNAL | | | | |
| 19. Exploratory | | 6 | | 4 |
| 20. Comfort | | 1 | 7 | |
| 22. Style of Interaction (verbal vs. nonverb) | 2 | 2 | | |
| INFANT | | | | |
| 1. Initial state | | | 4 | 6 |
| 2. Displeasure | 3 | 1 | 5 | |
| 4. Verbal | | | | 7 |
| 5. Success | | 1 | 1 | 1 |
| 8. Activity | 3 | 3 | 4 | 6 |

*Criterion used for level of loading is .48.

## TABLE 4.3

## TEACHING OBSERVATION - HARD TASK
## NUMBER OF FACTOR POSITION ON WHICH ITEMS LOAD* BY SUBJECT AGE

| Items and Clusters | 1 month | 4 months | 8 months | 12 months |
|---|---|---|---|---|
| MATERNAL | | | | |
| POSITIVE MESSAGES | | | | |
| 10. Positive Feedback | | 4 | | |
| 23. Affection | 3 | 4 | | |
| NEGATIVE MESSAGES | | | | |
| 11. Negative Feedback | 4 | 6 | 3 | 6 |
| 24. Disapproval | 4 | 6 | | 5 |
| TECHNIQUES | | | | |
| 12. Modeling | | | 5 | |
| 15. Directions | 6 | 5 | 6 | |
| 16. Forcing | 6 | | | |
| 17. Physical guidance | 6 | 5 | | 4 |
| FACILITATION | | | | |
| 13. Management Materials | 5 | 2 | 2 | 2 |
| 14. Positioning Infant | 5 | 2 | 2 | 2 |
| 18. Timing | 1 | | 3 | |
| 21. Sensitivity | 3 | 7 | 2 3 | 2 6 |
| INFANT | | | | |
| READINESS TO LEARN | | | | |
| 3. Attentiveness Task-Help | 1 | 1 | 1 | 1 |
| 6. Intensity Involvement | 1 | 1 | 1 | 1 3 |
| 7. Duration Involvement | 1 | 1 | 1 | 1 |
| 9. Alertness | 1 | 1 | 1 | 3 |
| INDEX SCORES OF INTEREST | | | | |
| MATERNAL | | | | |
| 19. Exploratory | | | | |
| 20. Comfort | | | | |
| 22. Style of Interaction (verbal vs. nonverb) | 3 | 4 | | 8 |
| INFANT | | | | |
| 1. Initial State | 2 | 3 | 4 | 7 |
| 2. Displeasure | 1 | 1 | | 5 |
| 4. Verbal | | | | |
| 5. Success | 1 | 1 | | 1 |
| 8. Activity | 2 | 3 | 4 | |

*Criterion used for level of loading is .48.

(shown on bottom of Table 4.2); they were thus not included. They were not discarded, though, at this developmental stage but were retained for analysis as individual items.

The five clusters actually depict the teaching process quite nicely: the way in which the mother structures the teaching situation (techniques and facilitation), how the infant responds (readiness to learn), and the type of feedback the mother provides (positive or negative messages).

The variable sets which define maternal behavior during teaching are:

1) *Positive message* including both the amount of contingent positive feedback and the amount of affection displayed toward the infant during the session. *Contingent positive feedback* refers to the verbal ("Good for you! That's right") or non-verbal (hugging, patting, or smiling at infant) behavior which is clearly approving of something the infant has just done compatible with the teaching process. *Affection* involves the mother's use of verbal and non-verbal messages of pleasure given directly in such a way as to be perceived by her infant.

2) *Negative message* consists of both the amount of contingent negative feedback and disapproval shown the infant by the mother. *Contingent negative feedback* refers to the verbal ("No, that's wrong," "Don't do that") or non-verbal (slapping, spanking, taking the infant's hand or taking materials from mouth or hands) behavior following infant task-inappropriate behavior. Inhibiting the infant's behavior is also considered negative feedback. *Disapproval* on the other hand, involves messages of displeasure with the infant, verbally ("You're sure dumb") or non-verbally (scowls, sighs loudly, laughs derisively) expressing her negative feelings for the infant.

Both of these sets are congruent with the literature. Studies of older children and mothers during teaching underline the importance of praise and encouragement in later learning. They also suggest the importance of providing feedback that is contingent on what the child has accomplished.

3) Techniques includes the various methods mothers use to teach their infants to learn. Modeling means the way the mother demonstrates all or part of the task for the child. Physical guidance is any type of physical prompting, touching or guidance provided to assist the child, but allowing the child to complete the task or required action on his own. Forcing, on the other hand, is actually compelling the infant to complete the task by placing a hand over the infant's hand, etc. Directions include the total amount of verbal (telling, coaxing, or orienting) or non-verbal (gesturing, pointing) messages to the child to perform the task.

Studies have shown that mothers who are intrusive or who physically interfere with the child's behaviors reduce the child's capability for independent action.

4) Facilitation depicts the mother's awareness and sensitivity toward her infant's needs and cues during the teaching. Management of materials is the degree to which the mother makes it easy or difficult for the infant to do the task by her placement of the task materials. Management of infant position deals with the mother's physical placement of the infant, i.e., is the position safe, and an easy one from which to perform? Timing involves the mother's pacing of her presentation of the task-specific stimulation, i.e., offering task help when the infant is attending, refraining from directing when the infant is attempting to respond. Sensitivity is the degree to which the mother appears tuned into her infant's communication and task performance, the frequency with which she responds to the infant's various cues, whether potent or subtle, during the task. These behaviors give insight into

the mother's style of teaching and the way in which she sets up the learning environment for the child.

In addition to a positive pattern of feedback, the contingency of feedback, clear directions, and permission for independent action, the teaching interaction should have a "cyclical" quality indicative of good pacing and timing of presentation. In addition to an overall sensitivity to the child, the physical handling of the learning situation should be sensitive to the learner's (infant's) needs.

As we discussed earlier, the child also acts as a stimulus; the infant's behavior affects the mother. One variable set defines infant behavior:

Readiness to learn is evidenced by: Responsiveness to mother's task-help, the degree to which the infant makes it worth the mother's efforts to teach or assist him in his performance, i.e., does the infant respond or attend to mother's attempts to help? Intensity of involvement, the infant's maximum interest in the task, the degree to which he tunes in to the materials and situation. Duration of involvement, the amount of time the infant is involved in doing or trying to do the task regardless of enthusiasm or intensity. Alertness, the maximum animated facial expression characteristic of the infant during the teaching situation.

The important dimensions to consider in observing infant behaviors during teaching center upon the infant's actual involvement (enthusiastic, intense, interested vs. inattentive, easily distracted, uninterested) and the responsivity displayed toward the mother and her efforts.

For the teaching scores composed of more than one item (the variable sets), the scores on the individual items were totaled and divided by the number of items in the set. This procedure results in an average score. For the items retained but not included in sets the actual score for the individual item was used.

An additional method of scoring the teaching scales, referred to as the Disbrow Score, is included for comparison purposes. This scoring method was devised by Dr. Mildred Disbrow and her colleagues at the University of Washington, for an extensive study of child abuse[1] in which these same teaching scales were used. This scoring method results in one maternal and one infant score. The information from all items is combined through a categorization scheme based on professional judgment of the desirability of each behavior. A high maternal Disbrow score reflects positive behavior. A high infant Disbrow score indicates a noncompliant child with less desirable behaviors. The actual scoring is further explained in Appendix 4.5.

Table 4.4 contains the descriptive statistics for our teaching variable sets, the items, and the Disbrow scores. As a group our study mothers gave more positive than negative messages when teaching their children. They scored outstandingly on facilitating behavior, and indeed they improved over the course of the year. Simultaneously the infants showed increasing readiness to learn. These positive changes in average ratings are also reflected in the Disbrow scores.

In looking at differences over time for any of our measures, particularly the behavioral observations, it is important to consider the potential effects of measurement per se. Longitudinal differences may reflect developmental stages or changing maternal behavioral patterns. They may also reflect changes due to repeated observations. In the observers' opinions, the mothers did

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[1] Measures to Predict Child Abuse funded by Maternal and Child Health Services, BCHS, HSA, PHS, DHEW.

## TABLE 4.4

## DESCRIPTIVE STATISTICS FOR VARIABLES FROM TEACHING RATING SCALES

| Variable | Descriptive Statistics | EASY TASK | | | | HARD TASK | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 mo. | 4 mo. | 8 mo. | 12 mo. | 1 mo. | 4 mo. | 8 mo. | 12 mo. |
| MATERNAL-POSITIVE MESSAGES | Median | 2.03 | 2.05 | 1.63 | 2.06 | 1.79 | 1.68 | 1.23 | 1.67 |
| | Range | 1.0-5.0 | 1.0-5.0 | 1.0-4.0 | 1.0-4.5 | 1.0-4.0 | 1.0-4.5 | 1.0-4.5 | 1.0-4.5 |
| | N | 171 | 175 | 160 | 151 | 141 | 174 | 154 | 148 |
| MATERNAL-NEGATIVE MESSAGES | Median | 1.20 | 1.16 | 1.08 | 1.23 | 1.22 | 1.18 | 1.89 | 1.32 |
| | Range | 1.0-4.5 | 1.0-3.5 | 1.0-2.5 | 1.0-3.0 | 1.0-5.0 | 1.0-4.0 | 1.0-5.0 | 1.0-4.0 |
| | N | 167 | 163 | 154 | 143 | 148 | 169 | 161 | 149 |
| MATERNAL-TECHNIQUES | Median | 2.49 | 1.99 | 1.92 | 2.31 | 1.97 | 2.12 | 2.79 | 2.61 |
| | Range | 1.0-4.0 | 1.0-3.3 | 1.0-3.5 | 1.0-3.5 | 1.0-4.0 | 1.0-4.8 | 1.3-4.0 | 1.5-4.5 |
| | N | 174 | 178 | 162 | 152 | 151 | 177 | 162 | 158 |
| MATERNAL-FACILITATION | Median | 3.53 | 4.02 | 4.02 | 4.08 | 3.78 | 4.02 | 3.77 | 3.94 |
| | Range | 1.0-5.0 | 1.3-5.0 | 2.3-5.0 | 2.5-5.0 | 1.3-5.0 | 1.0-5.0 | 1.5-5.0 | 1.5-5.0 |
| | N | 174 | 178 | 162 | 152 | 151 | 177 | 162 | 158 |
| MATERNAL-VERBAL STYLE | Median | 2.85 | 2.79 | 3.00 | 3.17 | 2.80 | 2.88 | 2.99 | 3.01 |
| | Range | 1-5 | 1-5 | 1-5 | 1-5 | 1-5 | 1-5 | 1-4 | 1-5 |
| | N | 172 | 178 | 162 | 159 | 151 | 176 | 162 | 159 |
| MATERNAL-EXPLORATORY | Median | 2.64 | 2.88 | 3.18 | 3.73 | 2.51 | 2.78 | 2.37 | 3.68 |
| | Range | 1-5 | 1-5 | 1-5 | 2-5 | 1-5 | 1-5 | 1-5 | 1-5 |
| | N | 153 | 165 | 159 | 158 | 97 | 157 | 160 | 159 |
| MATERNAL-COMFORT | Median | 3.49 | 4.53 | 4.86 | 4.90 | 3.52 | 4.44 | 4.61 | 4.89 |
| | Range | 1-5 | 1-5 | 1-5 | 3-5 | 1-5 | 1-5 | 1-5 | 3-5 |
| | N | 174 | 178 | 162 | 159 | 151 | 176 | 162 | 159 |
| MATERNAL-DISBROW SCORE | Median | 3.27 | 3.47 | 3.73 | 3.75 | 3.27 | 3.40 | 3.20 | 3.60 |
| | Range | 1.9-4.1 | 2.4-4.2 | 2.9-4.3 | 2.8-4.5 | 1.9-4.1 | 2.5-4.3 | 2.4-4.3 | 2.0-4.4 |
| | N | 166 | 160 | 152 | 144 | 138 | 167 | 154 | 145 |

TABLE 4.4 (continued--page 2)

| Variable | Descriptive Statistics | EASY TASK 1 mo. | 4 mo. | 8 mo. | 12 mo. | HARD TASK 1 mo. | 4 mo. | 8 mo. | 12 mo. |
|---|---|---|---|---|---|---|---|---|---|
| INFANT-READINESS TO LEARN | Median | 2.51 | 4.11 | 4.02 | 4.26 | 2.96 | 3.73 | 3.46 | 3.77 |
| | Range | 1.0-5.0 | 1.0-5.0 | 2.0-5.0 | 2.0-5.0 | 1.0-5.3 | 1.5-5.0 | 1.3-5.0 | 1.0-5.0 |
| | N | 174 | 178 | 162 | 152 | 151 | 177 | 161 | 158 |
| INFANT-INITIAL STATE | Median | 3.10 | 3.22 | 3.30 | 3.51 | 3.18 | 3.25 | 3.42 | 3.62 |
| | Range | 1-6 | 3-5 | 3-4 | 3-5 | 2-6 | 3-5 | 3-5 | 3-4 |
| | N | 174 | 178 | 161 | 159 | 150 | 177 | 161 | 159 |
| INFANT-DISPLEASURE | Median | 4.36 | 4.87 | 4.91 | 4.95 | 4.44 | 4.78 | 4.69 | 4.87 |
| | Range | 1-5 | 1-5 | 2-5 | 3-5 | 1-5 | 1-5 | 2-5 | 1-5 |
| | N | 174 | 178 | 161 | 159 | 150 | 177 | 161 | 158 |
| INFANT-VERBAL | Median | 1.22 | 1.44 | 1.56 | 1.94 | 1.24 | 1.57 | 1.85 | 2.12 |
| | Range | 1-2 | 1-5 | 1-4 | 1-4 | 1-4 | 1-4 | 1-4 | 1-4 |
| | N | 174 | 178 | 162 | 159 | 151 | 177 | 160 | 159 |
| INFANT-SUCCESS | Median | 3.30 | 3.91 | 4.01 | 3.91 | 3.46 | 3.37 | 3.01 | 2.42 |
| | Range | 1-5 | 1-5 | 1-5 | 1-5 | 1-5 | 1-5 | 1-5 | 1-5 |
| | N | 174 | 178 | 162 | 159 | 150 | 177 | 161 | 159 |
| INFANT-ACTIVITY | Median | 2.57 | 3.00 | 2.99 | 2.99 | 2.74 | 2.99 | 3.19 | 3.33 |
| | Range | 1-5 | 1-5 | 2-5 | 2-5 | 1-5 | 1-5 | 2-5 | 2-5 |
| | N | 173 | 178 | 162 | 159 | 151 | 177 | 161 | 159 |
| INFANT-DISBROW SCORE | Median | 3.22 | 2.76 | 2.77 | 2.68 | 3.00 | 2.79 | 2.78 | 2.68 |
| | Range | 2.2-4.7 | 1.9-4.4 | 2.0-3.9 | 1.9-3.7 | 2.2-4.8 | 1.9-4.4 | 1.9-3.9 | 2.0-4.3 |
| | N | 174 | 178 | 162 | 152 | 151 | 177 | 161 | 158 |

become more accustomed to the teaching episode with repeated home visits; knowing what to expect, they grew more comfortable with the whole idea. It is impossible to tell without a more controlled design what influence repeated measures has on these data.

Reliability. It is also important to consider the reliability of the instrument. The dual home visits made systematically throughout the study provide data for interobserver reliability. The reliability coefficients for the individual teaching items varied greatly among the ages and between the tasks. Interestingly, there was little difference in the reliability on items requiring an overall rating, such as "timing," and those rated on a quantification basis, such as "positive messages."[1] As expected, the reliability was greater when the items were combined into variable sets (Table 4.5). The range in coefficients, however, is still large: .23 to .84. The analysis of variance techniques we used to test reliability permitted us to examine effects on the coefficients from several sources. In this instance the data showed no evidence of systematic differences among home visitors. The principal cause of low coefficients was low subject variability with respect to the error of measurement. This finding indicates that the reliability of the teaching scales can be better determined in a more heterogeneous sample of mothers and infants. There is already some evidence for this; Disbrow et al. obtained consistently high interobserver reliability coefficients with a sample of child abusers and non-abusers.

Table 4.5 shows that our reliability was generally lower when observing mothers teaching 4 and 8 month old infants, especially on the hard task. The

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[1] See Appendix 4.6 for tables and a more detailed discussion of reliability.

## TABLE 4.5

## INTEROBSERVER RELIABILITY COEFFICIENTS FOR TEACHING SCALE VARIABLE SETS (PEARSON CORRELATIONS BY EASY AND HARD TASK)

| Cluster | Easy Task |  |  |  | Hard Task |  |  |  |
|---|---|---|---|---|---|---|---|---|
|  | 1 mo. | 4 mo. | 8 mo. | 12 mo. | 1 mo. | 4 mo. | 8 mo. | 12 mo. |
| Positive Messages | .69 | .61 | .43 | .73 | .79 | .47 | .63 | .69 |
| Negative Messages | .75 | .59 | .23 | .73 | .70 | .31 | .32 | .75 |
| Techniques | .60 | .56 | .77 | .64 | .78 | .55 | .47 | .68 |
| Facilitation | .66 | .60 | .64 | .52 | .70 | .38 | .41 | .64 |
| Infant Readiness to Learn | .84 | .81 | .60 | .54 | .82 | .79 | .34 | .71 |

reliability of the infant scores was lowest on the 8 month hard task. In retrospect this may be due to the specific tasks assigned for the teaching episodes at these ages. The 4 month hard task was picking up a cup by the handle. Since at 4 months the children were usually still in infant seats for sitting, the mothers were most likely to hold them on their laps with both facing a table on which the cup was placed. This positioning made it difficult for the mothers to see what the child was doing or for them to help in the learning process. In turn, it was difficult to score them on their teaching behavior.

The 8 month hard task was making a scribble with a crayon. This is age-appropriate for 10 months, yet is a novel stimulus to the curious, exploring 8 month old who, since he is at an age for mouthing, is more interested in putting the crayon in his mouth than drawing with it. The resulting restrictive behavior by the mother was not uniformly interpreted among observers.

The choice of the tasks for the teaching interaction is evidently important in further refinement of this assessment method. They should minimize conflicting positional or developmental requirements. These reliability findings must be taken into consideration for their potential influence on other findings from this study. Meanwhile it is encouraging to note the interobserver reliability which was achieved with a relatively simple observational method.

When the special cohort mothers and infants came to CDMRC, the teaching episode was repeated and videotaped. These tapes were scored on the teaching scales and compared with the ratings from the home visits. This offers some test-retest comparisons, but it is important to note the other differences which cloud the issue of test-retest reliability from these data:

1) differences in location, home vs. the university, 2) differences in viewpoint, live interaction vs. videotape, 3) differences due to prior practice since the home visit always came first, 4) random differences between two observers, 5) differences in the age of the child; during the first year of life the two or three weeks between the observations is related to greater behavior change than the same time would be at later ages. The test-retest coefficients (Table 4.6) are low and the reason(s) can not be attributed specifically to any one of the differences mentioned. The discrepancy could be due to any or to all of them. The short-term stability of teaching and learning behavior needs further examination with a different design. Given even the most rigorous design, however, the difficulties of separating out the different effects will probably never be completely overcome. In any assessment of human behavior it is probably most realistic to assume that more than one sample of behavior is needed to draw any conclusions as a basis for action. This can be done in practice by repeating the same assessment or by combining information from multiple concurrent assessments.

Validity. We have attempted to examine the validity of the teaching scales in several ways: from our data, from the research experience of others using the instrument and from practical application. We are, of course, especially eager to determine the predictive validity for preschool developmental outcomes in our sample. Meanwhile, we can begin to address the question of what is being measured.

If the teaching scales are measuring dimensions important to child development, we would expect certain relationships with maternal education. Correlations between mother's years of schooling and the scales are given in

## TABLE 4.6

## TEST RETEST RELIABILITY COEFFICIENTS FOR TEACHING SCALE VARIABLE SETS

| Cluster | Easy Task | | | | Hard Task | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 mo. | 4 mo. | 8 mo. | 12 mo. | 1 mo. | 4 mo. | 8 mo. | 12 mo. |
| Positive Messages | .36 | .22 | .16 | -.05 | .34 | .57 | .36 | .21 |
| Negative Messages | .34 | .16 | .08 | .52 | .05 | -.05 | .46 | .22 |
| Techniques | .45 | .22 | -.11 | .21 | .10 | .26 | .32 | .08 |
| Facilitation | .05 | -.05 | -.08 | -.04 | .13 | .18 | .22 | -.05 |
| Infant Readiness to Learn | .23 | .41 | .10 | .32 | .24 | .27 | -.07 | -.06 |

in Table 4.7. Mothers with more schooling than the others gave more positive messages and were more facilitating while teaching. This finding agrees with other literature which reports that more highly educated mothers give more feedback and more orientation to the task.

Mothers with more schooling also verbalize more to their children, especially early in infancy when the child contributes relatively little to the verbal exchange. By 8 months, maternal education begins differentiating mothers on other behavior; as the children developmentally became more active and aggressively curious the mothers with more schooling gave fewer negative messages and allowed more exploratory behavior. These findings are consistent with the literature on the importance of fostering the child's independent action.

As we suspected, the infants did not show collectively different behavior by maternal education; their teaching scores showed no consistent relationships with schooling across time points or tasks.

During the home visits the observers recorded whether they were concerned about the mother-infant interaction. This subjective overall impression offers another source of comparison with the teaching scales. The data indicate (Table 4.8) that observers tended not to be concerned if the mother used positive messages, was facilitative in teaching the infant, appeared comfortable, and generally displayed positive types of behavior reflected in the high Disbrow score. The observers reported some concern when the mother used negative types of messages at 8 and 12 months of age. There were fewer concerns apparent for the infants; the observers were concerned, however, if the infants were not "ready to learn," i.e., not involved in the learning situation.

Even stronger evidence of the construct validity of the teaching scales comes from the research of Disbrow et al. In a preliminary analysis of their

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## TABLE 4.7

## KENDALL CORRELATIONS BETWEEN TEACHING VARIABLES AND MOTHER'S YEARS OF SCHOOLING

| Teaching | Time Points | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | One | | Four | | Eight | | Twelve | |
| | Easy | Hard | Easy | Hard | Easy | Hard | Easy | Hard |
| MATERNAL | | | | | | | | |
| Positive messages | .24* | .19* | .14* | .18 | .29* | .23* | .20* | .16* |
| Negative messages | .07 | .12* | -.10* | -.02 | -.01 | -.24* | -.14* | -.27* |
| Techniques | .11* | .07 | .03 | .04 | -.02 | -.02 | -.12* | -.15* |
| Facilitation | .13* | .16* | .17* | .17 | .26* | .23* | .24* | .16* |
| Verbal Style | .21* | .25* | .14* | .14* | .08 | .00 | .10* | .10* |
| Exploratory | .06 | .08 | -.04 | .07 | .10* | .20* | .20* | .13* |
| Comfort | -.06 | -.09 | .06 | .08 | .29* | .13* | .10* | -.03 |
| INFANT | | | | | | | | |
| Initial State | -.01 | .15* | .10* | .04 | .01 | .03 | .11* | .03 |
| Verbal | -.01 | .12* | .06 | -.04 | .07 | .21* | -.03 | -.07 |
| Readiness to learn | .05 | .04 | -.04 | .06 | .04 | .02 | .09 | .02 |

* $p < .05$

A = 80, E = 4, O = 40.

## TABLE 4.8

## DIFFERENCES BETWEEN TEACHING SCORES BY OBSERVER CONCERN

| Teaching Scale Variables | Type Of Task | 1 Month | 4 Months | 8 Months | 12 Months |
|---|---|---|---|---|---|
| MATERNAL | | | | | |
| Positive Messages | EASY | NC | NC | NC | |
| | HARD | | NC | NC | NC |
| Negative Messages | EASY | | | C | C |
| | HARD | | | C | C |
| Techniques | EASY | | | | NC |
| | HARD | | | | |
| Facilitation | EASY | | NC | NC | NC |
| | HARD | | NC | NC | NC |
| Exploratory | EASY | | NC | | |
| | HARD | | | NC | |
| Comfort | EASY | NC | NC | NC | NC |
| | HARD | | NC | | NC |
| Verbal Style | EASY | | | | |
| | HARD | | | | |
| Disbrow Score | EASY | NC | NC | NC | NC |
| | HARD | | NC | NC | NC |
| INFANT | | | | | |
| Readiness To Learn | EASY | NC | NC | NC | NC |
| | HARD | | NC | NC | NC |
| Initial State | EASY | | | | |
| | HARD | | | | |
| Displeasure | EASY | | | | |
| | HARD | | | | |
| Verbal | EASY | | | | |
| | HARD | | | NC | |
| Success | EASY | | NC | | NC |
| | HARD | | | | |
| Activity | EASY | | | | |
| | HARD | | | | |
| Disbrow Score | EASY | | C | | |
| | HARD | | | | |

*Mann-Whitney U Test; one-tailed $p < .01$
C=Median score higher for subjects for whom observers had concerns.
N=Median score higher for subjects for whom there were no concerns.

sample they found a substantial negative relationship between facilitating teaching behavior and child abuse (tau = -.52, $p < .001$). Similarly, they found total positive maternal teaching behavior (the Disbrow score) correlated negatively with abuse (tau = -.41, $p < .001$). A smaller but statistically significant positive relationship was found between nonconforming child learning behaviors and child abuse.

Consistency. Taken together, these findings suggest that the teaching scales are measuring important aspects of interaction particularly on the part of the mother. If this is true we would tend to expect some consistency over time in the ratings, especially for the mothers. Appendix 4.7 contains the correlations across time. There is little association between infant learning behaviors during the first year of life. There is greater consistency on maternal teaching behaviors, e.g., positive messages. The size of the correlations, however, is small, indicating that assessments early in infancy are hardly representative of mothers' interaction with their 1-year-olds.

This lack of consistency over time is somewhat puzzling, since the factor loadings were fairly consistent. It is important to remember that measurement of parent-child interaction is a very complicated process. Added to the typical variability of human behavior are the influences of developmental change and of an evolving relationship. The factor analysis showed that there are clusters of maternal teaching and infant learning behaviors, styles if you will, that do group together irrespective of individual variation over time. This conclusion suggests that different mothers and babies are high or low on them at different times. It suggests furthermore that mothers come to know the responses of their infants, can see what "works," and are able to adjust their behavior to be effective over the developmental stages. The changing distributions on variables like "facilitation" and "readiness to learn" further support the interpretation that we are tapping an established, equilibrated interactional system at any given time point. In subsequent time points we then see behaviors which have changed to synchronize with current developmental and individual characteristics. Following this line of thought we would expect different secular patterns of interaction to develop within the sample over the first year of life.

Relationships Between Mother and Infant Behavior. From the method used in this study there is substantial evidence that maternal-infant behaviors are related. When individual items are combined into the teaching variable sets, fairly consistent patterns of inter-correlation appear at each age of the infant (Table 4.9). Mothers who were more facilitating and gave more positive messages had infants who were more ready to learn. Or, stated from the opposite point of view, infants who were more involved in the interaction elicited more facilitating behavior and more positive messages from their mothers. Of course, we don't know that either direction of causality is involved; undoubtedly both members of the pair influence each other.

As the children developed more initiative and motor skills, there was an increasing inverse relationship between their readiness to learn and the mother's negative messages and techniques, at least on the easy task.

There are also logical patterns among the maternal teaching behaviors at each age of the infant (Appendix 4.8). Mothers who were sensitive to their children, timed their teaching activities well, and managed the situation optimally (i.e., were high on facilitation) also were likely to show more positive affect and encouragement (positive messages). Mothers who did well in those respects were less likely to respond negatively to the child or employ

## TABLE 4.9

## CORRELATIONS BETWEEN INFANT "READINESS TO LEARN" AND MATERNAL VARIABLE SETS AT 1, 4, 8, 12 MONTHS OF AGE FOR EASY AND HARD TEACHING TASKS*

| | 1 | 4 | 8 | 12 |
|---|---|---|---|---|
| Easy Task | | | | |
| Facilitation | .38* | .39* | .37* | .33* |
| Positive messages | .22* | .09 | .00 | .14* |
| Negative messages | -.09* | -.13* | -.20* | -.33* |
| Techniques | .01 | -.13* | -.14* | -.31* |
| Hard Task | | | | |
| Facilitation | .40* | .40* | .23* | .24* |
| Positive messages | .37* | .22* | .20* | .31* |
| Negative messages | .08 | -.04 | -.12* | -.16* |
| Techniques | .02 | -.11* | .13* | -.09 |

* Kendall Correlation Coefficients; $p < .05$, Range of N = 138-178.

intrusive teaching techniques.

Since at each time point the mothers taught their infants an easy and a more difficult task, it was important to see if the behaviors on the two tasks were correlated and if the same things were being measured at each time point. The data in Appendix 4.9 suggest that the correlations are high enough to be measuring the same basic dimensions of behavior, but they are not necessarily obtaining the same assessment of behavior. Differences may arise from the more stressful nature of the hard task; mothers may feel more vulnerable when asked to teach their child a task where success is elusive. The hard task may turn out to be a better indicator of the mother's teaching style, since the easy task often requires little maternal teaching effort. It will be necessary to continue to look at both the easy and hard tasks until we can determine their predictive value.

Feeding

The feeding scales (Appendix 4.10) consist of 11 mother and 10 infant items:

- Initial set: the way the mother sets up the environment for feeding, e.g., positioning, and the state or readiness of the infant
- Focus: the degree of attentiveness or distractability
- Stimulation-response: the modes of stimulation and response used, e.g., visual, kinesthetic, tactile
- Affect: the mood, tension and irritability of mother and baby
- Control: the give and take or locus of control.

The feeding scales were another attempt to consolidate behaviors previously measured by counting into more global ratings of behavioral phenomena. While in the teaching scales no connotation of "optimum" was made, this connotation is a central feature of the feeding scales. The ratings include seven points, with the midpoint being more usual or expected behavior and the points on either side being deviations toward one extreme or the other. For example, mothers who provide no or excessive tactile stimulation at one month may both be considered 'deviant' in terms of the amount of tactile stimulation they provide for their infants. The items were constructed so they would be applicable to both solid and liquid (breast or bottle) feedings.

There are other distinctions between the feeding and the teaching scales as measures of parent-infant interaction. Feeding is an activity which must be engaged in by the infant and caretaker together and is a frequent routine interaction. Thus, it is not only a familiar task for the participants to demonstrate but one which forces them to adjust to each other. In this sense it can be considered a sample of the mother's and infant's adaptive behavior during interaction. The feeding observation is also a larger sample of behavior, since the duration is longer than for teaching during any one episode.

Observations of feeding were made in the home when the infant was 1, 4, 8, and 12 months of age. These observations were arranged around the feeding schedule of the infant. The mothers were told, "We are interested in observing a feeding time to find out more about the various styles mothers and infants have." When the time to feed arrived, the observer emphasized the importance of 1) the feeding's being natural, 2) the need for the observer to be silent, 3) observing both mother and infant continuously during the feeding, and 4) informing the observer when the feeding was completed.

> When you think _________ is ready to eat, please go ahead. Since we would like this time to be as natural as possible for both of you, I will not be talking with you during this time. I would like you to tell me when you have finished feeding, however. As you feed, please feel free to carry on your usual activities whatever they may be. If necessary I will follow you around and position myself so I am able to see both of you.

If the mother appeared anxious, unsettled, or inquisitive, we said: "Once again, you will recall, we are interested in the various styles mothers and infants have of interacting during the first year of life." In some cases the mothers did not refrain from talking to the observer. When this occurred the investigator would remind the mother of the need for silence. If talking persisted, the investigator responded minimally.

The feeding was undertaken by the person responsible for more than 60 percent of the infant's care. Following the observation the observer completed the subjective impressions (discussed later), rated the behaviors utilizing the rating scales, and interviewed the mother regarding the child's behavior.

The distributions of maternal behaviors on the feeding scales show the following trends (Appendix 4.11). During the 1-month milk feedings the majority of mothers showed "optimal" behaviors appropriate for the infant's age. They positioned their babies well, paced the feeding to their infant's needs, and utilized age-appropriate stimulation in the verbal, visual, kinesthetic, and tactile realms. Their moods and body position communicated animation and responsiveness to the child's cues. Similar behaviors occurred during the 4- and 8-month milk feedings. With increasing age of the children the mothers used less verbal stimulation (which one would expect since the infants were becoming more verbal and interacting with their mothers more) as well as less kinesthetic and tactile stimulation. The latter may be explained by the fact that the infants were beginning to drink milk from a glass by 8 months, and were positioned in a highchair, which precludes much maternal kinesthetic and tactile behavior. Another explanation is that infants during the eighth month period are quite distracted unless all stimulation is kept at a minimum, especially during the breast and bottle feeding. (Mothers frequently told us this.)

Infant findings during the milk feeding at 1 month showed them to be in a semi-alert state during most of the feeding; minimal motor activity was noted, although the infants were attentive to the feeding (if alert) and were capable of interacting via eye contact with their mothers. A balance in control was the mode; however, in cases of imbalance, the mother was more often the one to exert control over the situation than the infant. This is not the case for the 4- and 8-month milk feeding; the infants were more likely in control if a balance didn't exist. At 4 and 8 months there was also very little verbal behavior displayed by the infant, which is primarily accounted for by the nature of the milk feeding. Infants at this time were more alert; they focused more on the feeding situation than they had at 1 month. They also displayed more motor activity and appeared more animated and responsive.

Maternal behaviors during the solid feeding showed less tactile, kinesthetic, and verbal stimulation with increasing age of the infants. Here again, positioning and increasing verbalization by the baby probably contribute to this trend. Mothers continued to be animated and responsive to their infants, positioning and pacing the feeding in accord with the needs of the children. At later ages the infants were more alert and attentive to the solid feeding. They displayed more verbal behavior (consistent with age and type of feeding) with mood and tone depicting an animated, responsive infant. Although they were distracted at times by their environment, they frequently engaged in visual and verbal interaction with their mothers.

Since feeding is such a basic part of child rearing and well-being, two other instruments were completed by the home visitors following the teaching observation. First, the observers recorded their impressions of the feeding session, including a) the mother's organization of the situation, i.e., how well she managed the feeding time, the utensils, the food, and any interruptions that occurred, and b) the communication during the feeding interaction, that is, whether the mother and infant were "waltzing to the same tune" (in step as dancers would be), whether the mother behaved as though she liked her child, and whether the observer had any concerns about how the pair was functioning as a unit.

Then the mothers were interviewed briefly to obtain their opinions about infant feeding. They were asked to rate their feelings about feeding from very gratifying to unpleasant. Their permissiveness was reflected by whether they used demand versus scheduled feedings, by the latitude allowed for messiness, and by the policy on finishing all food provided for the baby. Ease of feeding included whether the mother had concerns about feeding, her satisfaction with the technical aspects, and whether she experienced difficulty with the feeding during the course of the day.

For the most part mothers had more positive feelings about feeding at the infants' younger ages. More mothers at 8 and 12 months expressed ambivalent or annoying feelings about feeding; this may be because the infant is exerting more independence, which tries the mother's patience.

Permissiveness seemed to be the trend, with most mothers adopting a demand schedule, i.e., feeding the child when he appears hungry rather than having a set schedule; expressing positive feelings toward messiness displayed by the infant ("That's part of learning to eat"); and watching for cues from the infant when he has had enough rather than adopting a "clean plate policy."

The majority of mothers experienced ease of feeding with their infants at the various ages, with the 8-month period seeming less difficult than the other time points. This appears to be in contrast to the findings on feelings about feeding; it may be, however, that 8-month-olds are easier to feed yet not as gratifying or as much fun to feed as the other age groups. According to the visitors' impressions, most of the mothers and infants were communicating well during the feeding and were organized in managing the situation.

These three different methods of assessing feeding offer some interesting methodological comparison. Before making them, however, it is necessary to explain the data reduction method used for the feeding observation scales.

Data Reduction for the Feeding Scales. The form of the feeding scales (optimal in the middle and deviant on either end) is useful clinically because "too much" of something can be distinguished from "too little." Profiles of the mother and infant can be drawn on the items to identify maladaptive patterns of feeding interaction. For example, if we found a hypoactive child we could look not only at the amount of stimulation the mother offered this child but we could also assess the primary mode of stimulation the mother used to get the infant to enter the interactive process. On the other hand, we could look at the amount of control the mother or the infant used in the feeding situation and then at the effect this has on the infant's behavior, such as his vocalization, attentiveness, or exploratory activity. Through considering individual items and the direction of their scoring for specific parent-infant pairs, this approach is useful to analyze the problem and structure a care plan.

It is also possible and desirable, however, to use the feeding interaction data to summarize the adaptiveness of mothers and babies both individually and in groups. By "folding" the scales so that the usual, desirable, optimal behavior is scored highest and any deviation from optimal is scored lower, the item scores can be summed. The result is a total feeding score which summarizes the adaptability across all behaviors.[1]

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[1] The precise method for obtaining a total feeding score is in Appendix 4.12 along with the descriptive statistics for the scores from our data.

The average maternal and infant total feeding scores showed little change over time. (To compare maternal means across ages the "mean scale score" must be used as it adjusts for the different numbers of items at different times.)

Reliability. Reliability for the feeding scales was tested in the same manner as for the teaching scales. The interobserver reliability for the total scores is shown in Table 4.10. Just as for the teaching, the infant feeding score was least reliable at 8 months.[1] Again this may be due to the developmental changes at this time which complicate the rating process. This decrease in reliability at 8 months was not evident, however on the scores from the observer impressions: for "communication" during feeding tau = .61 and for "organization" of the feeding tau = .86. This suggests both that maternal behavior can be rated quite reliably even without the lengthier, more structured scales and that the scales do not overcome reliability problems for infant behavior at the 8-month period.

The test-retest reliability for the feeding scores was low (Appendix 4.6) and the points made under discussion of the similar findings for the teaching observations also apply here (pages 4.22-23).

Consistency. Table 4.11 shows the relationships between feeding scores over the period of infancy. The maternal scores were somewhat consistent, but the correlations are low. There was even less consistency in infant behavior as measured by the feeding score. By contrast, there were stronger associations between the mothers' and infants' scores at each time point (Table 4.12).

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[1] At 4 and 8 months both milk and solid feedings were scored. For brevity of presentation, the milk feeding scores are used at 1 and 4 months and the solid feeding scores at 8 and 12.

### TABLE 4.10

### INTEROBSERVER RELIABILITY FOR MATERNAL AND INFANT FEEDING SCORES*

| | Maternal | | Infant | |
|---|---|---|---|---|
| | Pearson r | N | Pearson r | N |
| 1 month | .88 | 24 | .75 | 24 |
| 4 months | .62 | 18 | .90 | 18 |
| 8 months | .64 | 14 | .25 | 14 |
| 12 months | .71 | 15 | .68 | 15 |

*The 1 and 4 month scores are from the milk feeding. The 8 and 12 month scores are from the solid feeding.

### TABLE 4.11

### CONSISTENCY OF MATERNAL AND INFANT FEEDING SCORES OVER TIME

| | 4 month | 8 month | 12 month |
|---|---|---|---|
| Maternal | | | |
| 1 month | .26* | .21* | .13* |
| 4 months | | .24* | .15* |
| 8 months | | | .14* |
| Infant | | | |
| 1 month | .05 | .06 | .05 |
| 4 months | | -.03 | .06 |
| 8 months | | | .14* |

*Kendall correlation coefficients, $p < .05$; range of N = 126-181.

### TABLE 4.12

### CORRELATIONS BETWEEN MATERNAL AND INFANT FEEDING SCORES AT EACH TIME POINT

| Time Point | Maternal with Infant Feeding Score |
|---|---|
| 1 month | .34* |
| 4 months | .32* |
| 8 months | .26* |
| 12 months | .27* |

*Kendall correlation coefficients; $p < .01$; N = 146-181.

### TABLE 4.13

### ASSOCIATIONS BETWEEN FEEDING SCORES AND MOTHER'S YEARS OF SCHOOLING

| | 1 month | 4 month | 8 month | 12 month |
|---|---|---|---|---|
| Maternal Feeding Score | .17* | .12* | .31* | .18* |
| Infant Feeding Score | .09* | -.09 | .18* | .11* |

*Kendall correlation coefficients; $p < .05$; range of N = 145-180.

These findings support the idea that the feeding scales are measuring interactive behavior, behavior based more on reciprocal adaptation and response than the consistent individual styles or characteristics of the partners.

Validity. Further insight into the feeding scales as a method of assessing adaptation can be gained through associations with other study variables. As we would expect, the mothers' feeding scores were positively related to their years of schooling (Table 4.13); while the relationships are not strong, they are in the logical direction based on what we know about maternal education and child development. There is also some association between the infant feeding scores and maternal education; this too suggests reciprocity of behavior, as it is unlikely that infants behave differently according to their mothers' schooling unless there is a more direct association such as between maternal and infant behavior.

Comparisons between breast and bottle feedings at 1 and 4 months showed that feeding scores were significantly higher for mothers who breast fed. For the infants, however, scores did not differ by whether they breast fed. Since more mothers with higher education breast fed we made the same comparisons controlling for education. At 1 month, breast and bottle differences for mother's feeding score did not hold up; the association was secondary to maternal education. At 4 months, though, an interaction resulted. For mothers with more than a high school education there was no difference between breast and bottle feeding scores; for mothers with 12 years or less of schooling those who breast fed showed more adaptive feeding behavior. This finding of higher feeding scores for breast-feeding versus bottle-feeding low education mothers may have alternative explanations. Perhaps mothers who breast feed are different in their attitudes or their desire for close proximity to their babies. Or, perhaps the closer proximity makes mothers more aware of subtle infant cues and facilitates response.

One of the impressions recorded by the home visitors after observing the feeding was any concern they had about the maternal-child interaction. As shown in Table 4.14, those mothers and babies who elicited concern had significantly lower feeding scores. The use of observer concern as a validating criterion must of course be interpreted with caution, since the same person recorded the concern and rated the feeding scales in each home. The associations do indicate, however, that the scales contain dimensions which can capture clinical impressions. Furthermore, they capture them in a way which specifies more clearly and systematically what is awry with maternal-infant interaction and what might be done to help.

The other environmental assessments from our study provide further clues as to what the feeding scales measure. Table 4.15 shows the relationships between the maternal feeding scores and the teaching scores, the feeding interview variables, and the observer impressions. The correlations suggest at least two major dimensions which are reflected in the feeding score. The first has to do with the quality of communication between the mother and baby: adaptive mothers (as defined by their feeding score) gave more positive messages, fewer negative ones, and appeared to be "in tune" with their children from the perspective of an outside observer. The second has to do with the mother's organizational facilitative abilities; adaptive mothers scored higher on managing and timing the situation when interacting with their babies.

## DEVELOPMENTAL STIMULATION OF THE HOME ENVIRONMENT

The assessment methods presented in this section consider not only the

## TABLE 4.14

## DIFFERENCES BETWEEN FEEDING SCORES BY OBSERVER CONCERN

| Age | Feeding Score | Observer Concern | Median | N | z* |
|---|---|---|---|---|---|
| 1 month | Maternal | Concern | 34.9 | 59 | -7.77 |
| | | No concern | 43.0 | 120 | |
| | Infant | Concern | 24.0 | 59 | -3.93 |
| | | No concern | 26.1 | 120 | |
| 4 months | Maternal | Concern | 34.8 | 66 | -7.60 |
| | | No concern | 42.0 | 87 | |
| | Infant | Concern | 25.4 | 66 | -4.64 |
| | | No concern | 28.0 | 87 | |
| 8 months | Maternal | Concern | 30.0 | 42 | -7.23 |
| | | No concern | 36.0 | 98 | |
| | Infant | Concern | 25.5 | 42 | -5.13 |
| | | No concern | 27.9 | 98 | |
| 12 months | Maternal | Concern | 31.2 | 58 | -7.36 |
| | | No concern | 36.9 | 87 | |
| | Infant | Concern | 27.5 | 58 | -4.63 |
| | | No concern | 29.9 | 87 | |

*Mann-Whitney U test, $p < .001$ for all comparisons.

## TABLE 4.15

## CORRELATIONS BETWEEN MATERNAL FEEDING SCORES AND OTHER ENVIRONMENTAL ASSESSMENTS

|  |  | 1 mo. | 4 mo. | 8 mo. | 12 mo. |
|---|---|---|---|---|---|
| Teaching |  |  |  |  |  |
| Positive Messages | Easy | .34* | .18* | .18* | .18* |
|  | Hard | .21* | .06 | .31* | .19 |
| Negative Messages | Easy | .02 | -.12* | .02 | -.03 |
|  | Hard | -.09* | -.12* | -.12* | -.09 |
| Techniques | Easy | -.04 | .02 | .08 | .06 |
|  | Hard | -.07 | -.06 | -.02 | .00 |
| Facilitation | Easy | .22* | .17* | .12* | .20* |
|  | Hard | .20* | .12* | .20* | .10* |
| Readiness to Learn | Easy | .02 | .06 | .01 | .03 |
|  | Hard | .06 | .03 | -.01 | .04 |
| Feeding Interview |  |  |  |  |  |
| Permissiveness |  | -.07 | -.05 | .04 | -.13* |
| Ease of Feeding |  | .05 | -.03 | -.03 | -.04 |
| Feeding Impressions |  |  |  |  |  |
| Communication |  | .53* | .57* | .53* | .59* |
| Organization of Feeding |  | .27* | .08 | .31* | .21* |

*Kendall correlations, $p < .05$, N = 135-181.

interaction between parents and infants but also include the broader environmental stimulation including inanimate factors.

## Noise

Review of the literature had suggested the importance of considering the noise level of the environment as a potential detriment to child development. Various ways of measuring noise were investigated; those requiring sophisticated costly equipment were ruled out in the interest of feasibility. We devised a "Noise Inventory" on which the home visitors rated the level of noise during the interview and the source(s) of the noise. A "noise score" was constructed using these ratings. This assessment method was not pursued in the overall analysis due to the reliability findings for the dual home visits: at 8 months agreement was .57 but at 12 months it was down to .22.

## Toys

The "Toy Inventory" was developed in an attempt to sample the inanimate environment of the child on the basis of Yarrow's conceptualization. In his study the inanimate environment was classified on three dimensions: variety, responsiveness, and complexity. That is, the number of objects available to the child (variety), the degree of feedback potential inherent in the object (responsiveness), and the extent to which objects provide information through various modalities (complexity).

The Toy Inventory is essentially a sheet for listing each toy the child plays with at the current period of the home visit, with space for coding each one on the above dimensions. This tool did not turn out to be as feasible as we had hoped. With increasing age of the child, the toys became more numerous and difficult to code. Interobserver reliability also turned out to be a problem. The one dimension that could be reliably retrieved is "variety," as indicated by the number of different toys. This is an important aspect to know about the inanimate environment, but the occurrence of Christmas or the first birthday in relation to the home visit was confounding. Thus, this method was dropped from further consideration. The part which toys play in environmental stimulation was captured, however, in the subsequent assessment technique.

## The Home Stimulation Inventory

Dr. Bettye M. Caldwell and her colleagues at the Center for Early Development and Education, University of Arkansas, Little Rock, Arkansas, have made substantial contributions to assessing the home environment in recent years. Dr. Caldwell has been a consultant to this project and has given her permission to use the "Home Stimulation Inventory" (HSI) in our search for optimal assessment methods. This tool is designed to sample both the quality and quantity of social, emotional, and cognitive support within the home. Such aspects are assessed as the chance to form a basic attachment to a mother or mother substitute; a warm, not unduly restricted emotional environment; freedom for the child to explore and try to master his world; a variety of sensory experience; and a daily schedule that is on the whole orderly and predictable. The six major areas os environment assessed have been classified as follows:

1. Emotional and verbal responsiveness of mother
2. Avoidance of restriction and punishment
3. Organization of physical and temporal environment
4. Provision of appropriate play materials
5. Maternal involvement with child
6. Opportunities for variety in daily stimulation.

Wherever possible the HSI information is obtained through observation in the home. To score some items, however, interviewing the mother is necessary; this amounts to only about five minutes of questioning. The inventory is administered by an observer who visits the home at a time when the child is awake and involved in his normal routine for that time of day. The visitor begins the interview by asking the mother to describe a typical day in her child's current life--usually, since it is freshest in her mind, the day before the interview. As the mother talks about the events of the day, the visitor will learn about trips to the grocery store, visits from relatives and friends, stories read to the child, and many other activities. Information about toys and play materials comes readily from the visitor's own observation supplemented by interview items.

The version of the HSI used in this study at 4, 8, and 12 months was devised for children from birth to 3 years of age and is the fourth revision based on psychometric analysis by Caldwell et al. The six subscales resulted from factor analysis. A total score for the 45 items is obtained, as well as separate scores for the six subscales. All items receive binary yes-no ratings; the number of "yesses" constitutes the score. The higher the score, the more facilitating and stimulating the home environment.

Elardo et al (1975), based on a study of 176 families in central Arkansas, reported that raters can be quickly trained to achieve a 90 percent level of agreement. Our project bore this out. During the training period for our study the percent of items scored the same was calculated for dual observations; the range was 80 to 98 percent with a mean agreement of 91 percent.

Elardo et al also report the internal consistency coefficients range from .44 to .89 for the subscales and .89 for the total scale. Validity comparisons were made by correlating the scores with welfare status, maternal education, maternal occupation, presence of the father in the home, paternal education, paternal occupation, and crowding in the home. The resulting coefficients were moderate but positive, ranging from .25 to .55. In addition, their findings show predictive promise. Although their HSI scores obtained at 6 months of age were not significantly related to 12-month Bayley scores, they were significantly correlated with the 36-month Stanford-Binet test scores (r ranged from .24 to .40 for the subscales and r = .50 for the total score).

Descriptive statistics for the HSI scores in our sample are shown in Table 4.16.[1] With increasing age of the infants, scores were higher on the average for most of the individual subscales. Although the median was quite high for the first section, Emotional and Verbal Responsivity, as early as 4 months of age, the score continued to increase over time at 8 and 12 months. This indicates that, with increasing age, our mothers provided more contingent vocalizations to their infants, spontaneously praised their children more often, etc. Section II, Avoidance of Restriction and Punishment, on the other hand, decreased with age, which means the mothers were more restrictive or punitive of their infants at 8 and 12 months of age. This is to be expected since, as children become more mobile, their safety and well-being are at stake. Section III, Organization of the Physical and Temporal Environment, which has to do with how much the mother takes the child out of the home and how well she provides a safe environment for him remained fairly consistent. Section V, Maternal Involvement with Child, was somewhat lower at 8 months of age. This may also have something to do with the age-specific developmental

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[1] The frequency distributions and Ns are in Appendix 4.13.

## TABLE 4.16

## DESCRIPTIVE STATISTICS FOR HOME STIMULATION INVENTORY

| Variable | Descriptive Statistics | 4 mo. | 8 mo. | 12 mo. |
|---|---|---|---|---|
| EMOTIONAL AND VERBAL ~~RESPONSIBILITY~~ RESPONSIVITY<br>(Possible range=0-11) | Median | 9.71 | 9.85 | 10.18 |
| | Mean | 9.20 | 9.39 | 9.72 |
| | S.D. | 1.86 | 1.77 | 1.56 |
| AVOIDANCE OF RESTRICTION AND PUNISHMENT<br>(Possible range=0-8) | Median | 6.90 | 5.99 | 5.75 |
| | Mean | 6.70 | 5.75 | 5.40 |
| | S.D. | 1.14 | 1.41 | 1.74 |
| ORGANIZATION OF ENVIRONMENT<br>(Possible range=0-6) | Median | 4.89 | 5.01 | 4.94 |
| | Mean | 4.76 | 4.88 | 4.82 |
| | S.D. | 1.10 | 1.03 | 1.01 |
| PROVISION OF APPROPRIATE PLAY MATERIALS<br>(Possible range=0-9) | Median | 4.85 | 7.07 | 8.36 |
| | Mean | 4.83 | 6.83 | 7.91 |
| | S.D. | 1.66 | 1.63 | 1.49 |
| MATERNAL INVOLVEMENT WITH CHILD<br>(Possible range=0-6) | Median | 5.20 | 5.08 | 5.49 |
| | Mean | 4.73 | 4.76 | 5.00 |
| | S.D. | 1.46 | 1.33 | 1.23 |
| OPPORTUNITIES FOR VARIETY IN DAILY STIMULATION<br>(Possible range=0-5) | Median | 2.41 | 2.80 | 3.55 |
| | Mean | 2.48 | 2.80 | 3.43 |
| | S.D. | .92 | 1.15 | 1.22 |
| TOTAL STIMULATION SCORE<br>(Possible range=0-45) | Median | 33.65 | 35.08 | 37.54 |
| | Mean | 32.70 | 34.41 | 36.28 |
| | S.D. | 5.06 | 5.37 | 5.60 |

process, since this subscale deals with the ways in which the mother encourages developmental advance through structuring the child's play periods. Section IV, Provision of Appropriate Materials, increased steadily with the age of the child, indicating that toys were more available and more appropriate as the children grew. Opportunities for Variety in Daily Stimulation, Section VI, also increased steadily with age: mothers read stories oftener, care was more consistently provided for by father, and more time was spent with the family and relatives. Consistent with the majority of the subscales the total score medians increased steadily with the age of the child.

Distributions on the HSI for other populations, which would allow comparison with these findings, have not been published. Furthermore, no criterion value has been established to define "poor" or "good" scores. In general, however, the scores reflect the optimal environments one might expect from a sample such as ours.

The subscales of the HSI showed positive intercorrelations at each time point with few exceptions. The correlations are moderate (range of tau = -.01 - .43), however, indicating that they are not redundant measures of the same environmental dimensions.

The rank order relationships of the HSI scores between time points are somewhat stronger than we observed for the interactive assessments (Table 4.17). Even so, they are lower than one would expect for a soundly developed instrument with high interobserver reliability, especially since many of the items are based on observations of the home environment rather than on episodic demonstrated behaviors. One must conclude that this is more evidence of the many kinds of change characteristic of infancy: change in the baby, in the mother, in their behavior, and in the animate and inanimate stimulation

## TABLE 4.17

## CONSISTENCY OVER TIME OF VARIABLES FROM CALDWELL HOME STIMULATION INVENTORY AT 4, 8, 12 MONTHS

| Variable | | 8 Months | 12 Months |
|---|---|---|---|
| Emotional And Verbal Responsivity | 4 Months | .33* | .29* |
| | 8 Months | | .29* |
| Avoidance Of Restriction And Punishment | 4 Months | .25* | .31* |
| | 8 Months | | .31* |
| Organization Of Environment | 4 Months | .21* | .13* |
| | 8 Months | | .26* |
| Provision Of Appropriate Play Material | 4 Months | .24* | .21* |
| | 8 Months | | .27* |
| Maternal Involvement With Child | 4 Months | .19* | .16* |
| | 8 Months | | .24* |
| Opportunities For Variety In Daily Stimulation | 4 Months | .28* | .27* |
| | 8 Months | | .48* |
| Total Stimulation Score | 4 Months | .44* | .39* |
| | 8 Months | | .44* |

*Kendall Correlation Coefficients; $p < .01$; N=156-164 of the home environment. The moderate consistency of HSI scores also means that early assessments of the home stimulation are not interchangeable with those later in infancy. With long-term criterion measures, the optimum timing for this type of evaluation will become clearer.

As with the findings for our other environmental assessments, the HSI scores were positively related to maternal education; the strongest associations were with the total HSI scores (tau = .32, .41, and .36 for 4, 8, and 12 months respectively). These findings are comparable to those of Elardo _et al_; their correlations with education ranged from .25 to .55.

## RELATIONSHIPS BETWEEN ENVIRONMENTAL ASSESSMENTS

To what extent does the Home Stimulation Inventory reflect our other environmental assessments--those focusing on maternal-infant interaction? Table 4.18 shows that mothers with high HSI scores tended to give more positive and fewer negative messages to their children, were more facilitating when teaching, and showed more adaptive behavior during feeding. The babies in high HSI environments showed some indication, even as early as infancy, of better interactive behaviors during teaching and feeding. The correlations between environmental assessments are not so high, however, that they suggest redundant information. The findings reflect the fact that each method was devised to tap different aspects of the environment, yet the intercorrelations show a logical consistent pattern across methods.

## SUMMARY

In general, the relationships found between the environmental assessments and maternal education make sense and confirm other findings in the literature. They also lend a degree of construct validity to the assessment

TABLE 4.18

CORRELATIONS BETWEEN THE TOTAL HSI SCORE
AND TEACHING AND FEEDING SCORES

| | | 4 mo. | 8 mo. | 12 mo. |
|---|---|---|---|---|
| TEACHING | | | | |
| Maternal: | | | | |
| Positive Messages | Easy | .27* | .31* | .29* |
| | Hard | .31* | .28* | .30* |
| Negative Messages | Easy | -.05 | -.17* | -.19* |
| | Hard | -.04 | -.32* | -.26* |
| Techniques | Easy | .11* | .01 | -.12* |
| | Hard | .13* | -.01 | -.03 |
| Facilitation | Easy | .18* | .34* | .34* |
| | Hard | .13* | .29* | .28* |
| Infant: | | | | |
| Readiness to Learn | Easy | .08 | .11* | .11* |
| | Hard | .09* | .02 | -.04 |
| FEEDING | | | | |
| Maternal Score | | .28* | .35* | .30* |
| Infant Score | | .13* | .18* | .14* |

*Kendall Correlations, $p < .05$.

methods and, when more long range outcomes are available, may well lead to better understanding the underlying processes responsible for the influence of maternal education on child development.

Some of the relationships tested, however, did not turn out as expected. Significant correlations between the ordinal perinatal risk score and the environmental variables were very few and low (range -.13 to .21). They were also so inconsistent across types of variables and ages as to be uninterpretable in any meaningful way. It would seem that, especially for the infants, perinatal physiological compromise or trauma would influence later interactive behaviors. Perhaps the explanation for the lack of findings rests in the method of scoring perinatal risk or in the low incidence of severe complications within our sample. Or perhaps there are factors within the environment influencing development which override early physical events. This last interpretation is consistent with the recent report of the National Collaborative Study; a much greater proportion of variation in 4 year Stanford-Binet scores was explained by maternal education and socioeconomic variables than was accounted for by the physical, biological birth variables (Broman _et al._, 1975).[1]

The maternal and child behaviors exhibited by our study families were, on the average, logical for the developmental stages during infancy. The data describe a generally healthy group of mothers and babies in terms of environments conducive to social, emotional, and cognitive development.

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[1] The environmental variables in our study were also tested for association with sex of the baby. Only one low correlation was found to be statistically significant; considering the number of possibilities that one is undoubtedly spurious.

Variability among families and across ages was evident, however, suggesting different styles of interaction and different requirements for adaptation as the children grew. The stability of the environmental variables over time was low, with maternal behavior showing more consistency than infant behavior. This is logical: we would anticipate adult behavior to be more stabilized than that of a rapidly developing infant.

Considering the inconsistency between individuals over time in their interactive behavior, the stronger relationships between mother and infant behavior at any given time is of particular significance. The trends of our findings showed a similarity between the mothers and babies at each age assessed. That is, when mothers were more facilitating their infants showed more readiness to learn. When the mothers were more adaptive during feeding, so were their infants. Similarly, less positive behaviors were also shared by both members of the pair. This all suggests to us that during the first year mothers and babies experience times of "going apart" in their interactions and then "coming together" again.

The three major environmental assessments tested in this study were proven to be feasible operationally. For observations at any given point in time, the observers felt the mothers in general were not distracted by their presence, and that the episode ratings represented a true picture of the mothers' behavior. At the least one can be confident that scores are not inflated by observation, since it is very difficult to "stage" such skills.

The interobserver reliability for the teaching and feeding scales was respectable, and indications are that it will be even higher in more heterogeneous populations. Our experience reiterates the importance of adequate training and calibration in the use of the observation scales. We have trained a few local non-project personnel to use the scales. High inter-observer reliability was achieved on the teaching observations after 15 hours of instruction. Videotapes were used, yet live interaction would serve as well for instruction and reliability checks. It has been noted that the training time required differs according to whether the trainees are used to observing personal interaction.

For the teaching and feeding scales to be useful in practice, preparatory instruction must go beyond how to rate behavior. Concepts like "sensitivity" and "timing" and their importance must be understood. Unless observers have this understanding and a knowledge base of findings linking parent-child interaction to development, the ratings can not be interpreted or used as a basis for action. For example, for the mother's rating on teaching techniques to be meaningful, the practitioner must understand that intrusive mothers inhibit independent actions by the child.

Each of the three assessment methods presented here serves a somewhat different purpose. The HSI evaluates the stimulation available to the young child from a broad perspective including his exposure to a larger social environment and to inanimate objects. If the observer has reason to be in the home for any assessment purpose, most of the ratings can be done on the basis of what goes on during the visit; only about five minutes' additional interviewing of the mother is required to complete the HSI.

The interaction scales, on the other hand, assess more specific samples of behavior in greater depth. The teaching observation shows how the parent assists or inhibits the learning process and the involvement of the infant. The feeding observation shows the affection, organizational skills and adaptive behaviors of the mother and the child's reponsiveness during a necessary everyday task. The teaching episodes are more readily generated, not being as restricted to the child's schedule as the feeding; as for the time requirements, an average of 3 minutes is not excessive. Assessment of feeding on the average is more time consuming; the length of the sessions varies greatly and can take up to 45 minutes. The feeding interaction, however, because it is such an integral part of child rearing, may be amore sensitive reflection of parent-infant relationships and adaptation, especially for very young babies.

The knowledge base to accompany parent-child interactive assessment will be broadened with the future findings of this and other related studies. Meanwhile, there is little doubt that methods like the three discussed in this chapter are extremely useful in increasing the observer's sensitivity to the developmental environment. While clinicians can intuitively specify when something is wrong between a parent and child (as they did in the "interviewer impressions" in this study), these impressions are not of much utility in specifying the nature of the problem or what should be done about it. The observation scales and the Home Stimulation Inventory presented here do result in descriptive profiles of the environment on dimensions empirically developed; they increase the scope and depth of the information with which the clinician has to work.

APPENDIX 4.1

SUMMARY OF ENVIRONMENTAL VARIABLES

| Source | Variable | Composition of Variable Set | Direction of Values |
|---|---|---|---|
| Feeding Rating Scales (1,4,8,12 months) | Maternal Feeding Score | Sum of Scores:<br>Items 1-11,21 recoded on 4-point scale (see text) (Items 3 & 10 are omitted at 8 & 12 mos.) | high=optimal behaviors |
| | Infant Feeding Score | Sum of Scores:<br>Items 12,13,15-20 recoded on 4-point scale (see text) (Item 17 omitted at 1 & 4 mos.) | high=optimal behaviors |
| Feeding Interview | Feelings about Feeding | Individual score:<br>14. Feelings re feeding | high=unpleasant |
| | Feeding Permissiveness | Number of:<br>3. Demand schedule (1)<br>6. Allows messiness (4-7)<br>7. No "clean plate" policy (2) | high=permissive |
| | Ease of Feeding | Number of:<br>8. No difficult feedings (5)<br>11. Satisfied with technique (1)<br>17. No concerns re feeding (2) | high=easy to feed |
| Feeding Impressions | M-I Communication during Feeding | Number of:<br>1. Waltzing more than half time (5-7)<br>2. Positive M-I relationship (1)<br>4. Mother likes infant (1)<br>8. No concerns re M-I pair (3) | high=good |
| | Organization of Feeding | Number of:<br>2. Few interruptions (0-1)<br>3. Appropriate utensils (1)<br>4. Appropriate food (1)<br>5. Organized preparation (2) | high = organized |
| Teaching Rating Scales (1, 4, 8, 12 months) | Maternal-Positive Message | Average of scores:<br>10. Positive feedback<br>23. Affection | high = highly positive |
| | Maternal-Negative Message | Average of scores:<br>11. Negative feedback<br>24. Disapproval | high = highly negative |
| | Maternal Techniques | Average of scores:<br>12. Modeling<br>15. Directions<br>16. Forcing<br>17. Physical guidance | high = highly directive |
| | Maternal-Facilitation | Average of scores:<br>13. Management of materials<br>14. Positioning of infant<br>18. Timing<br>21. Sensitivity | high = good facilitation |
| | Maternal-Style of Interaction | Individual score:<br>22. Style of interaction | high = verbal<br>low = non-verbal |
| | Maternal-Exploratory | Individual score:<br>19. Exploratory | high = allows much exploration |

## APPENDIX 4.1 (continued)

| Source | Variable | Composition of Variable Set | Direction of Values |
|---|---|---|---|
| Teaching Rating Scales (continued) | Maternal-Comfort | Individual score:<br>20. Comfort | high = comfortable |
| | Maternal-Disbrow Score | Average of scores:<br>All maternal teaching items (see text) | high = positive behavior |
| | Infant-Readiness to Learn | Average of scores:<br>6. Intensity of involvement<br>7. Duration of involvement<br>9. Alertness<br>3. Attentiveness to task-help | high = high involvement |
| | Infant-Initial State | Individual score:<br>1. Initial state | high = more awake, active |
| | Infant-Displeasure | Individual score:<br>2. Displeasure | high = high pleasure |
| | Infant-Verbal | Individual score:<br>4. Verbal | high = high verbal |
| | Infant-Success | Individual score:<br>5. Success | high = successful |
| | Infant-Activity | Individual score:<br>8. Activity | high = high activity |
| | Infant-Disbrow Score | Average of scores:<br>All infant teaching items (see text) | high = negative behavior |
| Interview (4, 8 months) | Maternal Health | Individual score:<br>8. Health rating of self | high = poor health |
| | Infant Health | Individual score:<br>11. Health rating of infant | high = poor health |
| | Paternal Health | Individual score:<br>14. Health rating of father | high = poor health |
| Caldwell Home Stimulation Inventory (4, 8, 12 months) | Emotional and Verbal Responsivity | Sum of:<br>Section I | high = responsive |
| | Avoidance of Restriction and Punishment | Sum of:<br>Section II | high = not punitive |
| | Organization of Physical and Temporal Environment | Sum of:<br>Section III | high = organized |
| | Provision of Appropriate Play Materials | Sum of:<br>Section IV | high = appropriate play materials |
| | Maternal Involvement with Child | Sum of:<br>Section V | high = involved |
| | Opportunities for Variety in Daily Stimulation | Sum of:<br>Section VI | high = many opportunities |
| | Total Stimulation Score | Sum of:<br>All sections | high = good stimulation |
| Toy Inventory (4, 8, 12 months) | Number of Toys | Individual score:<br>Number of toys | high = more toys |
| Noise Inventory (1, 8, 12 months) | Noise Score | Product of:<br>Noise level rating<br>Number of noises | high = more noise |

# APPENDIX 4.2

UNIVERSITY OF WASHINGTON
School of Nursing
NURSING CHILD ASSESSMENT PROJECT

## MANUAL FOR RATING MOTHER-INFANT INTERACTIONS DURING TEACHING SITUATION

## INFANT BEHAVIOR

### A. Initial State of Infant

This scale is included primarily to provide information about the degree of handicap under which the mother starts her task presentation.

1. Asleep; eyes closed
2. Drowsy; drooping, partially closed eyelids, intermittantly closing eyes
3. Quiet awake. Infant clearly awake with eyes open. Physical activity at a minimum. Movement limited to two extremities or less. Attention is focused on some part of the environment.
4. Active awake, not crying. Infant animated, physically active, looking about. He/she may fuss, but is not considered "crying" unless he fully cries during more than half of the 30 second rating period.
5. Crying. Infant cries during more than half the state-rating period.

### B. Infant's Displeasure during Task

This scale is intended to focus on the negative or distressed end of the happy-unhappy continuum, and should reflect the amount of time the infant was clearly displeased.

1. Infant displays displeasure nearly constantly, as indicated by crying or active fussing. Infant may attempt to remove him/herself from the situation. However, if the infant crawls away out of attraction to something else, inattention to the task, or to tease the mother, one can not score him as trying to escape from a presumably aversive situation. Clear displeasure must be displayed through vocalizing or facial expression, including crying, fussing, whining, fretting, frowning, etc.
2. Infant displays displeasure more than half the time. Unhappiness may be arrested temporarily by an interesting spectacle or soothing procedure.
3. Infant displays displeasure about half the time. It is not necessary to distinguish between a "neutral" or "happy" state as regards the remainder of the time.
4. Infant displays displeasure less than half the time.
5. Infant displays no displeasure

### C. Responsiveness to Mother's Task-Help

This scale provides information about the degree to which the infant makes it worth the mother's efforts to try to teach him/her. Apart from whether the infant succeeds in performing the task, we want to know the degree to which the infant tunes in to the mother's attempts to teach, which presumably can be considered a form of feedback from the infant. Ratings should be based upon infant behavior rather than upon mothers' sensitivity to infant behavior; the infant should be considered "responsive" on those occasions in which the rater observes responsiveness but which the mother apparently misses. Task-help refers to any of the possible things a mother might do to elicit performance or partial performance, such as getting the infant's attention, eliciting necessary motor activity, etc.

0. Not applicable. Mother gave no task-help.
1. No attention to task-help. Infant did not do as he/she was told, urged, coaxed, or otherwise directed relative to the task. This could be due to outright rejection of the task, disinterest, tantrums, sleep, etc.
2. Attention to task-help less than half the time. Infant may look briefly when mother urges him to look, for example, but does little more.
3. Attention to task-help approximately half the time.
4. Attention more than half the time.
5. Infant continuously attends to mother's task help.

Note: Mothers may vary considerably in their amount of task-help. However, infant should be rated on the basis of the actual task-help given, even though there might not be much task-help to respond to.

### D. Infant Vocalization

Amount of time the infant spends cooing, gurgling, babbling, talking, etc., excluding crying and involuntary respiratory noises. When in doubt, the rater should assume a vocalization.

1. Infant does not vocalize
2. Less than half the time
3. About half the time
4. More than half the time
5. Infant vocalizes nearly continuously

## APPENDIX 4.2 (continued--page 2)

E. Task Success

This scale provides information about whether the infant was successful with the task, and the degree of autonomy of his success from the mother's efforts. Success is rated on basis of rater's perception, rather than mother's.

1. Infant does not try to do the task; infant does nothing more than look at the materials or his/her mother.

NOTE: 1-month, alternate "Social Smile" task. If the infant watches the mother but fails the task, he/she should be rated "2".

2. Infant tries but fails the task, with or without mother's help.

3. Infant successfully completes the task, but only with mother's physical help. This applies to those instances in which the infant can perform the task only when the mother is physically guiding his/her response.

NOTE: 3-month "Hang on to Red Ring" task should be scored "3" when mother holds ring against infant's palm, eliciting grasp reflex, but does not release her support or pressure on the ring.

4. Infant successfully completes task by him/herself after the mother's teaching of any kind, including simply telling the infant what to do.

5. Infant successfully and spontaneously completes the task without any physical help or instruction from the mother.

F. Involvement with Task: Intensity

This scale involves the quality or character of the infant's involvement with the task, and differs from Scale C in that the infant's own interest in the materials and task may not necessarily correspond to mother's task-help. Intensity ratings should be based on whatever rating represents the infant's maximum involvement: When the light's on, how bright is it?

1. Infant is barely there. Infant displays active or passive rejection of the materials and task. This would occur when the infant never wants to have anything to do with the task.

2. Infant displays mild interest, such as passive looking unaccompanied by approach behavior.

3. Infant displays moderate interest which includes approach movements.

4. Infant appears focused on and involved with the task, but involvement is less than intense.

5. Infant displays eager, intense enthusiasm and involvement with the task, as indicated by facial expression and body movement.

G. Involvement with Task: Duration

This scale involves the amount of time the infant is involved with the task, regardless of his/her enthusiasm.

1. No interest in task or task materials. Infant never becomes involved.

2. Infant involved with task less than half the time.

3. Infant involved with task approximately half the time.

4. More than half the time.

5. Continuous involvement with the task.

H. Activity

This is a physical motion scale. Rate in terms of amplitude of motion and the most characteristic level of entire teaching episode.

1. Infant stays quietly in one place, with no self-initiated movement apart from sucking and other facial movement.

2. Infant is motorically quiet although moves head and/or head and hands, and/or hands alone.

3. Infant displays moderate activity, including head-arms-trunk, head-legs-trunk, arms only, or legs only.

4. Infant displays large muscle activity in all extremities.

5. Vigorous large muscle activity in all extremities.

I. Alertness as conveyed through facial expression

This is an "animated facial expression" scale in which considerations of physical activity should be excluded from the ratings. Ratings should be based on instances of maximum animation.

0. Impossible to rate because of prolonged crying.

1. Dull; unresponsive to stimuli. Minimal focusing on either mother, task materials, or features of room.

2. Somewhat alert.

3. Infant seems focused but without enthusiasm.

4. Alert. Infant focused with some enthusiasm.

5. Infant alert. Focused with intense enthusiasm.

# APPENDIX 4.2 (continued--page 3)

## MATERNAL BEHAVIOR

### A. Contingent Postive Feedback (Verbal and Nonverbal)

Positive feedback here is defined as either verbal (e.g. "Good for you," "That's right," etc.) or nonverbal (patting, hugging, smiling at infant) behavior which is clearly approving of something the infant has just done which is compatible with the teaching process.

0. Not applicable. Infant never did anything appropriate (i.e. never attended, never attempted, etc.).
1. Never. Mother gave no positive feedback.
2. Once or twice.
3. Occasionally: 3-5 times
4. Frequently: 6+ times
5. Continuous positive feedback given to infant's task-appropriate behavior.

### B. Contingent Negative Feedback (Verbal and Nonverbal)

Mother's negative feedback, either verbal (e.g. "No," "That's wrong," "Don't do that") or nonverbal (slapping, spanking, taking infant's hand or materials from mouth, taking materials from infant's hands, etc.) follows infant's task-inappropriate behavior, including inattention. Even though some mothers may "correct" and reprimand in a playful manner, the reprimand should be rated as negative feedback because of the content. Note that inhibiting the infant's behavior is considered negative feedback.

0. Not applicable. Infant did nothing inappropriate or incompatible with task performance.
1. Never
2. Once or twice
3. Occasionally: 3-5 times
4. Frequently: 6+ times
5. Continuous negative feedback for task-incompatible behavior. Infant is unable to get away with anything.

### C. Modeling

Mother demonstrates or models all or part of task (i.e. she shows him all or part of what she wants him to do).

1. Never
2. Once
3. Occasionally: 2-5 times
4. Frequently: 6+ times
5. Nearly constantly. Infant can hardly do the task due to mother's possession of the materials.

### D. Management: Materials

This scale involves how well mother manages the physical aspects of the situation, and has nothing to do with her teaching style, interaction, or motivation. In rating this scale, keep in mind how easy or difficult the mother makes the task on the basis of her managing the materials. Are there unnecessary, distracting materials lying about: Can the infant reach the materials easily? Is the working surface the right height and firmness?

0. Not applicable. No materials needed for task.
1. Very poor management. Physically impossible for baby to do the task, due to mother's poor management (e.g. materials outside infant's reach).
2. Physically difficult for baby to perform task.
3. Moderately good management. "Oversights" balanced by good features. Mother corrects her mistakes.
4. Good management.
5. Excellent management. Mother makes the task easy by her management of materials. Does extra clever, inspired things to maximize performance.

### E. Management: Infant

This scale is similar to "D", but deals with the mother's physical management of the infant, rather than the materials. Note whether the infant is placed in an awkward position, whether mobility which the mother allows is detrimental to performance, whether arms and hands are cramped or allowed optimal motion, etc.

1. Very poor management. Infant is in an impossible position to perform the task. Mother consistently prompts or elicits a response which is incompatible with the required behavior.
2. Physically difficult for baby to perform task.
3. Moderately good management. "Oversights" balanced by good features.
4. Good management.
5. Excellent management. Because of the way mother manages the infant, it would be easy to perform the task if he/she could. Inspired, clever mother.

### F. Mother's Directiveness: Amount of Direction

This scale refers to the amount of time spent by the mother in giving directions of any kind, including both verbal (telling, coaxing, etc.) and nonverbal (modeling, gesturing, pointing) messages to the child to perform. The kind of directions and the affect accompanying them are not important.

1. No directions or instructions given. Mother does nothing to direct attention to the materials.
2. Mother spends less than half the time giving directions, allowing the infant to solve the problem without her stimulation or engage in non-task behavior the majority of the time.
3. Mother directs infant about half the time.
4. Mother directs infant more than half the time.
5. Mother directs infant continuously, never cycles.

NOTE: On 1 and 4 month tasks in which the mother must suspend the ring, a rating of "1" is considered impossible if the mother holds the ring in front of the infant.

# APPENDIX 4.2 (continued--page 4)

## G. Mother's Directiveness: Amount of Physical Forcing

This scale involves the number of times the mother physically forces the infant to complete the task. It does not include instances in which the mother forces or guides part of the task, allowing the infant to complete the required action on his/her own.

1. Never
2. Once or twice
3. Occasionally: 3-5 times
4. Frequently: 6+ times
5. Nearly continuously

NOTE: 1-month 2nd task "Reaches for Dangling Ring" task. If mother physically pushes the infant's arm toward the ring, even slightly, this must be considered a "force." However, if mother pushes arm toward ring on the 4-month "Reach for and Grasp Ring" task, this would be considered "Guiding" (Scale H), since mother had not placed ring in infant's hand and closed infant's fingers around it.

## H. Mother's Directiveness: Amount of Physical Guidance

This scale involves the amount of physical prompting or touching, or physical guidance given during part of the behavior required to perform the task. Mother may direct the infant's arm toward an object to be grasped, or may even place the task object in the infant's hand as long as she refrains from physically causing him/her to complete the task.

1. Never
2. Less than half the time
3. About half the time
4. More than half
5. Continuous physical guidance

## I. Timing

This scale involves the mother's timing of her presentation of task-specific stimulation, with respect to instruction (e.g. offering task-help at the appropriate time, refraining from directing or modeling when appropriate, etc.) or with respect to presenting and taking away materials. Do not rate on the basis of timing of contingent positive or negative feedback.

1. Consistently poor timing. Mother gives stimuli too fast or too slowly, misperceives response latency, interrupts infant's activity to a degree that infant is unable to enjoy task or materials, "teaches" when infant is not attending, etc.
2. Generally poor, but with occasionally adequate timing.
3. Timing is good as often as it is poor.
4. Timing generally good, but with occasional lapses.
5. Excellent timing. Mother teaches consistently on basis of infant's cues, does not interrupt his efforts.

## J. Permission for Exploratory Behavior

This scale refers to the amount of non-task-achieving playing around the mother allows either initially, during, or at the completion of the task. Exploratory behavior includes efforts by the infant to familiarize him/herself with the materials and to engage in non-task-specific play. In order to qualify for "exploratory" behavior, the infant must be physically in control of the materials.

0. Not applicable. Child makes no attempt to physically explore the materials.
1. No independent exploratory behavior allowed by mother, either before or after task completion.
2. Mother allows only brief episodes of exploratory behavior. The exploratory behavior is interrupted and the child brought back to the task.
3. Mother allows reasonable amount of exploratory play before or after task completion.
4. Mother allows extended non-task play before and after task completion.
5. Exploratory behavior is freely allowed with no restriction placed on the amount of time the infant engages in non-task-specific play with materials.

NOTE: During 1 and 4 month tasks in which the mother is suspending the ring, exploratory behavior can't occur unless the infant actually manages to gain control of the ring.

## K. Mother's Comfort

This scale is an evaluation of how comfortable the mother appears during the teaching task.

1. Very uncomfortable.
2. Mildly uncomfortable.
3. Variable in comfort.
4. Relatively comfortable.
5. Very comfortable.

## L. Sensitivity

This scale involves the degree to which the mother appears tuned in to her infant's communication and task performance. This rating might be facilitated if the rater put him/herself in the place of the infant and rated on the basis of how easy or frustrating it might be to communicate with that particular mother.

1. Insensitive to obvious and subtle cues of infant's state, mood, task behavior, and physical needs.
2. Occasionally responsive to obvious signals, but misses some. May "notice" and comment on cues, but fail to act.
3. Generally responsive to obvious cues, but misses subtle ones.
4. Responsive to obvious cues and usually responsive to subtle cues.
5. Very sensitive: almost invariably responsive to subtle and obvious cues.

Obvious cues
crying
sleeping
spitting up
actively trying to escape
active involvement with task

Subtle cues
motor cues for eating (e.g. mouthing, rooting)
whimpering
smiling
body posture indicating task rejection and frustration
motor movements indicating incipient problem-solving

M. Mother's Style of Interaction

Mother's predominant or relative style of interaction with her infant (not with Home Visitor or other children):

1. Mostly nonverbal: gesturing, modeling, taking objects from mouth or out of hand, patting, stroking, kissing, attracting infant to task by shaking or banging materials, etc.
2. More nonverbal than verbal, even though there may be a large amount of both kinds.
3. Half and half
4. More verbal than nonverbal
5. Mostly verbal, as compared to nonverbal.

N. Mother's Display of Affection for Infant

This scale involves messages of pleasure in her infant given directly to the infant or to the Home Visitor in such a way as to be perceived by the infant. Messages can be given either verbally or nonverbally, but should include specific statements or actions rather than some indirect inference or impression that the infant is "liked" by his/her mother.

1. Never
2. Once
3. Occasionally, 2-3 times
4. Frequently: 4-6 times
5. Continuously

O. Mother's Display of Negative Feeling or Disapproval

This scale involves messages of displeasure with the infant. Mother verbally (You're sure dumb) or nonverbally (scowls, sighs loudly, laughs derisively) expresses her negative feeling for her infant.

1. Never
2. Once
3. Occasionally, 2-3 times
4. Frequently: 4-5 times
5. Continuously

1. Does mother give positive social feedback to task-incompatible behaviors as often (or more) than for task-appropriate behaviors?
2. Did you like this mother?

   If no, why not?
3. Are you worried about this mother-infant pair?
   a. Yes, I'm a little worried
      Explain
   b. Yes, I'm worried a great deal
      Explain
   c. No, I'm not worried
4. Include comments made by mother before, after, or during the teaching episode (after instructions have been given).
5. Comments or reactions to the time element involved, mother, infant qualities, styles, etc.

## APPENDIX 4.3

## DISTRIBUTION OF INFANT SCALE POINTS ON EASY AND HARD TEACHING TASKS

### ONE MONTH

| Scale Items | Scale Points | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Infant Scales (Easy) | | | | | |
| Initial State | 1.1 | 8.1 | 68.6 | 18.6 | 3.4 |
| Displeasure | 3.4 | 12.6 | 8.6 | 29.3 | 46.0 |
| Responsiveness | 12.1 | 40.2 | 19.0 | 23.0 | 5.7 |
| Vocalization | 69.5 | 30.5 | 0 | 0 | 0 |
| Success | 2.3 | 8.6 | 48.9 | 37.9 | 2.3 |
| Intensity | 15.5 | 41.4 | 24.1 | 17.2 | 1.7 |
| Duration | 16.1 | 37.9 | 23.0 | 18.4 | 4.6 |
| Activity | 4.6 | 42.8 | 37.6 | 12.7 | 2.3 |
| Alertness | 7.3 | 26.8 | 41.5 | 20.1 | 4.3 |
| Infant Scales (Hard) | | | | | |
| Initial State | 0 | 4.0 | 68.4 | 24.8 | 2.7 |
| Displeasure | 6.0 | 14.0 | 9.3 | 22.0 | 48.7 |
| Responsiveness | 14.7 | 26.7 | 21.3 | 27.3 | 10.0 |
| Vocalization | 67.5 | 29.1 | 2.0 | 1.3 | 0 |
| Success | 23.3 | 10.0 | 17.3 | 46.7 | 2.7 |
| Intensity | 13.2 | 23.2 | 27.8 | 27.8 | 7.9 |
| Duration | 15.2 | 33.1 | 22.5 | 19.2 | 9.9 |
| Activity | 3.3 | 37.7 | 36.4 | 18.5 | 4.0 |
| Alertness | 2.8 | 17.6 | 40.1 | 30.9 | 8.5 |

### FOUR MONTH

| Scale Items | Scale Points | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Infant Scales (Easy) | | | | | |
| Initial State | 0 | 0 | 69.5 | 29.3 | 1.1 |
| Displeasure | 0.6 | 1.7 | 0.6 | 17.2 | 79.9 |
| Responsiveness | 2.3 | 5.2 | 11.5 | 42.0 | 39.1 |
| Vocalization | 53.4 | 33.3 | 8.0 | 4.6 | 0.6 |
| Success | 5.2 | 6.3 | 6.9 | 77.6 | 4.0 |
| Intensity | 2.3 | 2.9 | 12.1 | 44.8 | 37.9 |
| Duration | 2.9 | 6.3 | 14.4 | 43.7 | 32.8 |
| Activity | 0.6 | 27.6 | 44.3 | 22.4 | 5.2 |
| Alertness | 0.6 | 2.9 | 23.6 | 44.8 | 28.2 |
| Infant Scales (Hard) | | | | | |
| Initial State | 0 | 0 | 66.7 | 32.2 | 0.6 |
| Displeasure | 0.6 | 5.8 | 5.2 | 19.1 | 69.4 |
| Responsiveness | 1.7 | 16.9 | 27.9 | 37.8 | 15.7 |
| Vocalization | 46.8 | 42.8 | 5.2 | 5.2 | 0 |
| Success | 5.8 | 18.5 | 29.5 | 41.6 | 4.6 |
| Intensity | 0.6 | 8.7 | 27.7 | 39.3 | 23.7 |
| Duration | 2.9 | 20.2 | 26.0 | 35.8 | 15.0 |
| Activity | 0.6 | 28.3 | 42.8 | 22.0 | 6.4 |
| Alertness | 1.7 | 7.5 | 32.9 | 41.0 | 16.8 |

### EIGHT MONTH

| Scale Items | Scale Points | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Infant Scales (Easy) | | | | | |
| Initial State | 0 | 0 | 62.1 | 37.9 | 0 |
| Displeasure | 0 | 0.6 | 0 | 14.3 | 85.1 |
| Responsiveness | 0 | 3.8 | 15.7 | 47.2 | 33.3 |
| Vocalization | 47.5 | 42.6 | 6.2 | 3.7 | 0 |
| Success | 2.5 | 2.5 | 1.2 | 85.2 | 8.6 |
| Intensity | 0.6 | 1.9 | 4.3 | 54.9 | 38.3 |
| Duration | 2.5 | 6.8 | 19.8 | 45.1 | 25.9 |
| Activity | 0 | 23.5 | 53.7 | 20.4 | 2.5 |
| Alertness | 0.6 | 2.5 | 17.3 | 62.3 | 17.3 |
| Infant Scales (Hard) | | | | | |
| Initial State | 0 | 0 | 54.0 | 44.1 | 1.9 |
| Displeasure | 0 | 3.7 | 6.8 | 28.0 | 61.5 |
| Responsiveness | 5.0 | 23.6 | 37.3 | 32.3 | 1.9 |
| Vocalization | 34.4 | 45.0 | 15.6 | 5.0 | 0 |
| Success | 5.0 | 20.5 | 47.8 | 25.5 | 1.2 |
| Intensity | 3.1 | 4.3 | 25.5 | 41.0 | 26.1 |
| Duration | 4.3 | 42.9 | 28.0 | 22.4 | 2.5 |
| Activity | 0 | 12.4 | 54.7 | 26.1 | 6.8 |
| Alertness | 0 | 4.3 | 17.4 | 58.4 | 19.9 |

### TWELVE MONTH

| Scale Items | Scale Points | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Infant Scales (Easy) | | | | | |
| Initial State | 0 | 0 | 49.7 | 49.7 | 0.6 |
| Displeasure | 0 | 0 | 1.3 | 8.2 | 90.6 |
| Responsiveness | 0.6 | 6.3 | 14.6 | 38.0 | 40.5 |
| Vocalization | 24.5 | 57.2 | 13.8 | 4.4 | 0 |
| Success | 1.3 | 11.9 | 5.7 | 75.5 | 5.7 |
| Intensity | 0.6 | 0.6 | 1.3 | 54.1 | 43.4 |
| Duration | 1.3 | 5.0 | 17.6 | 36.5 | 39.6 |
| Activity | 0 | 19.5 | 61.6 | 17.0 | 1.9 |
| Alertness | 0 | 1.9 | 4.4 | 75.5 | 18.2 |
| Infant Scales (Hard) | | | | | |
| Initial State | 0 | 0 | 43.4 | 56.6 | 0 |
| Displeasure | 0.6 | 0.6 | 1.3 | 18.4 | 79.1 |
| Responsiveness | 2.5 | 15.7 | 34.6 | 34.0 | 13.2 |
| Vocalization | 18.2 | 50.9 | 24.5 | 6.3 | 0 |
| Success | 7.5 | 45.9 | 14.5 | 31.4 | 0.6 |
| Intensity | 1.9 | 3.8 | 8.2 | 45.3 | 40.9 |
| Duration | 5.7 | 24.5 | 30.2 | 29.6 | 10.1 |
| Activity | 0 | 5.7 | 53.5 | 34.6 | 6.3 |
| Alertness | 0 | 3.2 | 9.5 | 64.6 | 22.8 |

APPENDIX 4.3 (Continued--page 2)

DISTRIBUTION OF MATERNAL SCALE POINTS ON EASY AND HARD TEACHING TASKS

ONE MONTH

| Scale Items | Scale Points 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Maternal Scales (easy) | | | | | |
| Positive Feedback | 36.0 | 45.9 | 12.8 | 4.1 | 1.2 |
| Negative Feedback | 66.9 | 23.1 | 7.1 | 2.4 | 0.6 |
| Modeling | 54.6 | 21.8 | 21.3 | 1.7 | 0.6 |
| Management-Materials | 1.8 | 7.0 | 26.9 | 50.9 | 13.5 |
| Management-Position | 1.7 | 5.7 | 29.9 | 48.3 | 14.4 |
| Direction | 6.3 | 10.3 | 24.1 | 54.0 | 5.2 |
| Forcing | 54.0 | 25.3 | 16.1 | 2.9 | 1.7 |
| Physical Guidance | 5.2 | 23.0 | 40.8 | 27.6 | 3.4 |
| Timing | 8.0 | 10.9 | 32.8 | 39.1 | 9.2 |
| Exploratory | 7.8 | 35.9 | 43.1 | 11.1 | 2.0 |
| Comfort | 4.0 | 8.6 | 36.2 | 16.7 | 34.5 |
| Sensitivity | 5.8 | 11.1 | 28.1 | 42.7 | 12.3 |
| Style | 7.6 | 25.6 | 47.7 | 18.6 | 0.6 |
| Affection | 22.1 | 37.2 | 29.7 | 8.7 | 2.3 |
| Disapproval | 68.6 | 16.9 | 12.2 | 2.3 | 0 |
| Maternal Scales (Hard) | | | | | |
| Positive Feedback | 56.7 | 27.7 | 9.9 | 5.0 | 0.7 |
| Negative Feedback | 67.6 | 27.7 | 2.7 | 1.4 | 0.7 |
| Modeling | 88.1 | 9.3 | 2.0 | 0.7 | 0 |
| Management-Materials | 1.3 | 6.6 | 22.5 | 45.7 | 23.8 |
| Management-Position | 1.3 | 7.3 | 27.8 | 41.7 | 21.9 |
| Direction | 6.0 | 15.2 | 23.2 | 51.7 | 4.0 |
| Forcing | 71.5 | 12.6 | 6.6 | 4.6 | 4.6 |
| Physical Guidance | 25.8 | 46.4 | 18.5 | 6.6 | 2.6 |
| Timing | 8.6 | 9.9 | 27.8 | 43.7 | 9.9 |
| Exploratory | 18.6 | 30.9 | 37.1 | 10.3 | 3.1 |
| Comfort | 5.3 | 9.9 | 34.4 | 14.6 | 35.8 |
| Sensitivity | 5.3 | 12.7 | 20.7 | 41.3 | 20.0 |
| Style | 6.6 | 28.5 | 49.7 | 13.9 | 1.3 |
| Affection | 35.8 | 25.2 | 28.5 | 9.3 | 1.3 |
| Disapproval | 62.3 | 19.2 | 15.2 | 2.6 | 0.7 |

FOUR MONTH

| Scale Items | Scale Points 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Maternal Scales (easy) | | | | | |
| Positive Feedback | 29.8 | 43.9 | 14.0 | 7.6 | 4.7 |
| Negative Feedback | 71.2 | 23.1 | 5.6 | 0 | 0 |
| Modeling | 79.3 | 16.1 | 2.9 | 1.7 | 0 |
| Management-Materials | 0 | 4.0 | 10.9 | 64.9 | 79.9 |
| Management-Position | 0.6 | 2.3 | 13.8 | 63.8 | 19.5 |
| Direction | 2.9 | 14.9 | 21.8 | 56.3 | 4.0 |
| Forcing | 89.0 | 8.1 | 2.9 | 0 | 0 |
| Physical Guidance | 28.7 | 42.0 | 20.7 | 8.0 | 0.6 |
| Timing | 1.1 | 5.2 | 13.8 | 49.4 | 30.5 |
| Exploratory | 7.5 | 24.8 | 46.0 | 19.9 | 1.9 |
| Comfort | 1.1 | 0.6 | 21.3 | 9.2 | 67.8 |
| Sensitivity | 1.2 | 3.5 | 20.0 | 50.0 | 25.3 |
| Style | 9.8 | 23.6 | 54.0 | 10.3 | 2.3 |
| Affection | 23.6 | 38.5 | 30.5 | 5.7 | 1.7 |
| Disapproval | 76.2 | 14.5 | 7.0 | 1.7 | 0.6 |
| Maternal Scales (Hard) | | | | | |
| Positive Feedback | 40.9 | 42.7 | 9.4 | 3.5 | 3.5 |
| Negative Feedback | 69.5 | 22.2 | 6.6 | 1.2 | 0.6 |
| Modeling | 55.5 | 19.1 | 22.5 | 2.9 | 0 |
| Management-Materials | 2.9 | 4.6 | 24.9 | 48.6 | 19.1 |
| Management-Position | 3.5 | 4.6 | 28.3 | 48.0 | 15.6 |
| Direction | 1.7 | 21.4 | 27.2 | 44.5 | 5.2 |
| Forcing | 78.5 | 14.0 | 5.2 | 1.7 | 0.6 |
| Physical Guidance | 17.4 | 47.7 | 20.3 | 14.0 | 0.6 |
| Timing | 1.2 | 8.1 | 22.1 | 50.0 | 18.6 |
| Exploratory | 5.8 | 29.9 | 50.0 | 11.7 | 2.6 |
| Comfort | 1.2 | 0 | 28.5 | 6.4 | 64.0 |
| Sensitivity | 1.8 | 7.6 | 30.0 | 41.2 | 19.4 |
| Style | 8.7 | 20.9 | 51.7 | 18.0 | 0.6 |
| Affection | 48.8 | 32.0 | 16.9 | 2.3 | 0 |
| Disapproval | 71.8 | 17.1 | 8.8 | 2.4 | 0 |

APPENDIX 4.3 (Continued--page 3)

DISTRIBUTION OF MATERNAL SCALE POINTS ON EASY AND HARD TEACHING TASKS

EIGHT MONTH

| Scale Items | Scale Points 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Maternal Scales (easy) | | | | | |
| Positive Feedback | 48.1 | 40.0 | 9.4 | 0 | 2.5 |
| Negative Feedback | 79.2 | 15.6 | 5.2 | 0 | 0 |
| Modeling | 28.4 | 26.5 | 38.9 | 4.9 | 1.2 |
| Management-Materials | 0 | 1.2 | 12.3 | 60.5 | 25.9 |
| Management-Position | 0 | 0 | 13.6 | 63.6 | 22.8 |
| Direction | 4.3 | 25.9 | 31.5 | 37.7 | 0.6 |
| Forcing | 96.9 | 1.9 | 1.2 | 0 | 0 |
| Physical Guidance | 74.7 | 14.2 | 7.4 | 3.7 | 0 |
| Timing | 0.6 | 1.9 | 14.3 | 52.2 | 31.1 |
| Exploratory | 1.3 | 22.6 | 38.4 | 33.3 | 4.4 |
| Comfort | 1.2 | -- | 11.1 | -- | 87.7 |
| Sensitivity | 0.6 | 2.5 | 18.1 | 57.5 | 21.2 |
| Style | 8.0 | 16.0 | 51.9 | 21.6 | 2.5 |
| Affection | 42.0 | 38.9 | 19.1 | 0 | 0 |
| Disapproval | 93.2 | 6.2 | 0.6 | 0 | 0 |
| Maternal Scales (Hard) | | | | | |
| Positive Feedback | 72.9 | 20.6 | 5.2 | 0 | 1.3 |
| Negative Feedback | 29.8 | 21.1 | 34.2 | 12.4 | 2.5 |
| Modeling | 12.4 | 5.6 | 46.6 | 34.2 | 1.2 |
| Management-Materials | 0.6 | 3.1 | 21.0 | 51.2 | 24.1 |
| Management-Position | 0 | 1.9 | 26.5 | 50.0 | 21.6 |
| Direction | 0 | 10.6 | 27.3 | 55.3 | 6.8 |
| Forcing | 25.3 | 24.7 | 38.9 | 9.9 | 1.2 |
| Physical Guidance | 16.0 | 49.4 | 22.8 | 11.1 | 0.6 |
| Timing | 1.2 | 9.9 | 41.4 | 43.2 | 4.3 |
| Exploratory | 10.6 | 45.0 | 25.6 | 16.9 | 1.9 |
| Comfort | 3.1 | -- | 24.7 | -- | 72.2 |
| Sensitivity | 0.6 | 8.0 | 34.0 | 46.9 | 10.5 |
| Style | 3.1 | 15.4 | 64.2 | 17.3 | 0 |
| Affection | 62.1 | 23.0 | 14.3 | 0.6 | 0 |
| Disapproval | 73.5 | 14.2 | 11.1 | 0.6 | 0.6 |

TWELVE MONTH

| Scale Items | Scale Points 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Maternal Scales (easy) | | | | | |
| Positive Feedback | 17.8 | 31.8 | 31.2 | 10.2 | 8.9 |
| Negative Feedback | 56.2 | 30.1 | 11.8 | 2.0 | 0 |
| Modeling | 18.3 | 20.1 | 34.0 | 27.0 | 0.6 |
| Management-Materials | 0 | 0.6 | 7.5 | 74.2 | 17.6 |
| Management-Position | 0 | 0 | 8.8 | 70.4 | 20.8 |
| Direction | 1.9 | 13.2 | 25.2 | 57.9 | 1.9 |
| Forcing | 87.4 | 6.3 | 5.0 | 1.3 | 0 |
| Physical Guidance | 54.7 | 24.5 | 16.4 | 3.1 | 1.3 |
| Timing | 1.3 | 0.6 | 16.4 | 51.6 | 30.2 |
| Exploratory | 0 | 10.1 | 30.4 | 40.5 | 19.0 |
| Comfort | 8.2 | -- | 1.3 | -- | 90.6 |
| Sensitivity | 0 | 2.5 | 14.5 | 56.0 | 27.0 |
| Style | 2.5 | 14.5 | 49.1 | 29.6 | 4.4 |
| Affection | 43.4 | 34.0 | 20.1 | 2.5 | 0 |
| Disapproval | 90.5 | 8.2 | 1.3 | 0 | 0 |
| Maternal Scales (Hard) | | | | | |
| Positive Feedback | 40.9 | 29.9 | 18.8 | 2.6 | 7.8 |
| Negative Feedback | 51.0 | 31.8 | 11.5 | 4.5 | 1.3 |
| Modeling | 1.3 | 2.5 | 42.1 | 52.2 | 1.9 |
| Management-Materials | 0.6 | 5.0 | 16.4 | 55.3 | 22.6 |
| Management-Position | 0.6 | 1.3 | 10.7 | 67.9 | 19.5 |
| Direction | 0 | 5.7 | 22.6 | 65.4 | 6.3 |
| Forcing | 77.4 | 15.7 | 5.7 | 1.3 | 0 |
| Physical Guidance | 44.7 | 34.6 | 15.7 | 4.4 | 0.6 |
| Timing | 5.0 | 2.5 | 27.0 | 52.2 | 13.2 |
| Exploratory | 1.3 | 13.2 | 28.9 | 36.5 | 20.1 |
| Comfort | 0 | -- | 10.1 | -- | 89.9 |
| Sensitivity | 0 | 3.8 | 23.9 | 52.2 | 20.1 |
| Style | 1.3 | 20.1 | 56.6 | 18.9 | 3.1 |
| Affection | 47.8 | 35.8 | 13.8 | 2.5 | 0 |
| Disapproval | 86.1 | 9.5 | 3.8 | 0.6 | 0 |

## APPENDIX 4.4

### FACTORS FROM MOTHER-INFANT INTERACTION SCALES AT ONE MONTH TEACHING

| AT AGE LEVEL TASK* | | ABOVE AGE LEVEL TASK** | |
|---|---|---|---|
| Factors | Loadings | Factors | Loadings |
| 1. | | 1. | |
| Attention to task-help | .78 | Attention to task-help | .87 |
| Intensity of involvement | .80 | Intensity of involvement | .87 |
| Duration of involvement | .80 | Duration of involvement | .87 |
| Alertness | .78 | Alertness | .68 |
| | | Displeasure | .50 |
| | | Success | .48 |
| | | Material timing | .49 |
| 2. | | 2. | |
| | | Initial state | -.59 |
| Contingent Positive feedback | .66 | Activity | -.68 |
| Affection | .73 | | |
| Verbal style | .48 | 3. | |
| | | Affection | .50 |
| 3. | | Sensitivity | .54 |
| Displeasure | .75 | Verbal style | .61 |
| Activity | .69 | | |
| | | 4. | |
| 4. | | | |
| Physical guidance | .54 | Contingent negative feedback | .74 |
| Directions | .56 | Disapproval | .66 |
| 5. | | 5. | |
| Management of materials | .72 | Management of materials | .79 |
| Positioning of infant | .75 | Positioning of infant | .67 |
| Timing | .55 | | |
| Sensitivity | .55 | 6. | |
| 6. | | Direction | .48 |
| | | Forcing | .52 |
| Contingent negative feedback | .69 | Physical guidance | .49 |
| Disapproval | .61 | | |
| 7. | | | |
| Modeling | .50 | | |

*At age level task: grasp ring
**Above age level task: reach for dangling ring

### FACTORS FROM MOTHER-INFANT INTERACTION SCALES AT FOUR MONTH TEACHING

| AT AGE LEVEL TASK* | | ABOVE AGE LEVEL TASK** | |
|---|---|---|---|
| Factors | Loadings | Factors | Loadings |
| 1. | | 1. | |
| Attention to task-help | .82 | Attention to task-help | .83 |
| Intensity of involvement | .63 | Intensity of involvement | .73 |
| Duration of involvement | .84 | Duration of involvement | .87 |
| Alertness | .55 | Alertness | .63 |
| Displeasure | .63 | Displeasure | .50 |
| Success | .60 | Success | .56 |
| Maternal timing | .60 | | |
| Maternal comfort | .51 | 2. | |
| | | Management of materials | .86 |
| 2. | | Positioning of infant | .81 |
| Contingent positive feedback | .67 | 3. | |
| Affect | .61 | Initial state | .54 |
| Verbal style | .54 | Activity | .74 |
| 3. | | 4. | |
| Intensity of involvement | .50 | Contingent positive feedback | .66 |
| Alertness | .57 | Affection | .56 |
| Activity | .76 | Verbal style | .56 |
| 4. | | 5. | |
| Contingent negative feedback | .63 | Physical guidance | .66 |
| Disapproval | .59 | Directions | .58 |
| 5. | | 6. | |
| Management of materials | .70 | Contingent negative feedback | .76 |
| Positioning of infant | .66 | Disapproval | .62 |
| Timing | .50 | 7. | |
| Sensitivity | .55 | Sensitivity | .58 |
| 6. | | | |
| Modeling | .35 | | |
| Exploratory | .49 | | |

*At age level task: reach for and grasp ring
**Above age level task: lift cup by handle

APPENDIX 4.4 (continued)

FACTORS FROM MOTHER-INFANT INTERACTION SCALES AT EIGHT MONTH TEACHING

| AT AGE LEVEL TASK* | | ABOVE AGE LEVEL TASK** | |
|---|---|---|---|
| Factors | Loadings | Factors | Loadings |
| 1. | | 1. | |
| Intensity of involvement | .68 | Intensity of involvement | .71 |
| Duration of involvement | .55 | Duration of involvement | .66 |
| Attention to task-help | .49 | Alertness | .69 |
| Infant success | .51 | Attention to task-help | .74 |
| 2. | | 2. | |
| Contingent positive feedback | .57 | Management of materials | .84 |
| Affection | .48 | Positioning of infant | .73 |
| | | Sensitivity | .51 |
| 3. | | 3. | |
| Management of materials | .74 | Contingent negative feedback | -.64 |
| Positioning of infant | .67 | Timing | .51 |
| | | Sensitivity | .65 |
| 4. | | 4. | |
| Initial state | .52 | Initial state | .60 |
| Activity | .63 | Activity | .57 |
| Alertness | .49 | | |
| 5. | | 5. | |
| Maternal contingent negative feedback | .54 | Modeling | .54 |
| Infant displeasure | .59 | | |
| 6. | | 6. | |
| Duration of involvement | .64 | Directions | .63 |
| 7. | | | |
| Forcing | -.53 | | |
| Physical guidance | -.48 | | |
| Comfort | .53 | | |

*At age level task: Uncovers toy

**Above age level task: Scribble with crayon

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FACTORS FROM MOTHER-INFANT INTERACTION SCALES AT TWELVE MONTH TEACHING

| AT AGE LEVEL TASK* | | ABOVE AGE LEVEL TASK** | |
|---|---|---|---|
| Factors | Loadings | Factors | Loadings |
| 1. | | 1. | |
| Duration of involvement | .84 | Attention to task help | .88 |
| Attention to task-help | .76 | Success | .59 |
| Success | .72 | Intensity of involvement | .49 |
| | | Duration of involvement | .87 |
| 2. | | 2. | |
| Management of materials | .72 | Management of materials | .71 |
| Positioning of infant | .67 | Positioning of infant | .75 |
| | | Sensitivity | .52 |
| 3. | | 3. | |
| Contingent positive feedback | .69 | Intensity of involvement | .66 |
| Affection | .66 | Alertness | .53 |
| 4. | | 4. | |
| Contingent negative feedback | -.48 | Physical guidance | .75 |
| Directions | -.65 | | |
| Exploratory | .56 | | |
| 5. | | 5. | |
| Physical guidance | -.70 | Displeasure | .61 |
| | | Disapproval | .57 |
| 6. | | 6. | |
| Initial state | .50 | Negative feedback | -.49 |
| Activity | .68 | Sensitivity | .50 |
| 7. | | 7. | |
| Intensity of involvement | .49 | Initial state | .51 |
| Alertness | .49 | | |
| Verbal | .53 | | |
| 8. | | 8. | |
| Modeling | .65 | Verbal style | .62 |

*At age level: places 3 cups in cup

**Above age level: stacks one cube on top of other

# APPENDIX 4.5

## THE DISBROW TEACHING SCORES

The Disbrow Score is based on a categorization derived by professional judgment. Each of the individual scale scores for both the infant and mother behaviors are summed. A high score for the infant reflects a noncompliant infant. A high score for the mother reflects positive maternal behavior. Some of the scales were reversed or renumbered in order to comply with the mother's positive-negative behavior or compliant-noncompliant child.

### Scales for Child Behaviors

1. For scales E,F,G,H, and I, scores are reversed with 1=high=5.
2. For scales A,B,C, and D, 1 and 5=high=3
   2 and 4=medium=2
   3=low=1

Individual scale scores are summed. A high score reflects a high handicap for the parent because of a noncompliant child.

### Scales for Parent Behaviors

1. Scales A,D,E,I,J,K,L,M, and N, are scored as they are.
2. For scales B,G,H, and O, scores are reversed with 1=high=5.
3. For scale C, 3=high=3
   2 and 4=medium=2
   1 and 5=low=1
4. For scale F, 2=high=3
   1 and 3=medium=2
   4 and 5=low=1

Individual scale scores are summed. A high score reflects positive parental behavior.

## APPENDIX 4.6

## Reliability

An important step in the development of measurement instruments is the determination of their reliability; that is, the accuracy and consistency with which scores discriminate individual differences. In observational work it has been common for reports of inter-observer agreement (usually in percentage terms) to substitute for conventional reliability estimates. However, this practice is unsatisfactory for several reasons, the most important of which is that it takes into account only observer differences as possible sources of error in the measurement process. (See Johnson and Bolstad, 1973, for a complete discussion of this point). Consequently, we have made conscientious attempts in this study to collect data which could be used for conventional reliability estimates. In addition, the decision was made, based on data such as reported by Reid (1970) to use data collected in the study proper, rather than during pretest procedures, to estimate and report reliability. Given the alternative methods for the evaluation of the reliability of our assessment tools we have consistently chosen to use the most conservative method of establishing reliability coefficients. So in interpreting the following coefficients the reader should recognize that they always represent the lowest (most conservative) estimate.

The following pages and tables will report on the reliability of new assessment instruments developed during the present research, i.e., the Teaching and Feeding Scales. Two separate estimates of reliability, roughly equivalent to inter-observer and test-retest reliability will be reported.

### INTEROBSERVER RELIABILITY

Procedures. On approximately every eighth home visit, a second staff member accompanied the primary home visitor. This "co-investigator" did not participate in the interview nor consult with the primary home visitor during the visit. She did, however, fill out all forms and score all assessment tools used during the visit.

It should be noted that the person designated as "primary home visitor" and the person designated as "co-investigator" were not the same individuals throughout the course of data collection. For this reason, the error component of the computed coefficients may be expected to reflect inconsistencies in the paired observers and are possibly lower than those expected if the same two individuals had performed all observations.

Any comparison between data collected by the primary home visitor and the co-investigator is subject to two additional sources of error: systematic differences between the two points of view involved, and random error due to individual differences in the two observers themselves.

Teaching Reliability. Tables 1 and 2 report the reliability of the individual Teaching Scales used in this study. In Table 1, the two tasks administered at each home visit were anticipated to be samples of the same behavior. The coefficients reported in this table are intraclass correlations based on a subjects by observers by task analysis of variance. Coefficients were computed and reported separately for each item at each age. In tasks such as those used in teaching it is always the intention that the two forms of the task differ on a quantitative level but represent performance on the same qualitative scale. The relatively small magnitude of these coefficients, combined with the professional judgment of the staff suggests that in some cases the two tasks (easy and difficult) were not samples of the qualitatively same competencies. These observations led to the analysis reported in Table 2.

In Table 2, coefficients are reported separately for tasks one and two at each age. As can be seen, these coefficients are a very great improvement over those for which those tasks were taken together. This focuses on an advantage of the present system of evaluating reliability in that it allows the developer to identify specific problem areas and remedy them.

Table 4.5 reports the reliability coefficients for the summary cluster scores used in most of the analyses of the teaching data. (Not surprisingly, the reliability of these clusters exceeds that of the individual items.)

None of the analyses performed on these data provided any support for systematic differences between primary home visitors and co-investigators. The principal cause of low coefficients was low subject variability with respect to the error of measurement.

Feeding Reliability. Table 3 shows the reliability of the Feeding Scales used in this study. A combination of experience, observation and common sense suggests that feedings of milk (breast or bottle) and of solid foods should be considered separately as they are representative of different samples of behavior. Therefore, for purposes of analysis, feedings of milk (breast or bottle) and of solid foods were analyzed separately. Milk feedings were rated at 1, 4, and 8 months of age; solid food feedings were rated at 4, 8, and 12 months. In general these coefficients are quite high. Table 4.10 reports the coefficients for the total feeding scores used in most of the analyses of the feeding data. Once again, the reliability of the summed scores is generally higher than that of the individual items.

Discussion. In general, the magnitude of the reliability coefficients for the Feeding and Teaching Scales and for the summary scores are very encouraging. As we have already pointed out, the goal of application and the efforts directed at maintaining naturalistic assessment settings prove to threaten reliability in the best designed research. Given the internal and external threats to reliability inherent in the Feeding and Teaching Scales our present findings can only be interpreted in a positive light.

### TEST RETEST RELIABILITY

Procedures. Approximately every fifth participant in this study was invited to become part of a special, smaller group of subjects who were studied somewhat more in detail than the sample as a whole. Members of this group visited the clinic of the Child Development and Mental Retardation Center following each home visit. Among the procedures of this visit were the videotape recording of the feeding and teaching interactions. From this videotape record, a set of teaching and feeding ratings was later made which could be compared with the ratings made in the home during the regular visit.

It should be noted that there are at least four sources of error in making the comparison between the home and clinic ratings: 1) differences in location, home vs. clinic; 2) differences in viewpoint, live interaction vs. videotape; 3) differences due to prior practice, since the home visit always preceded the clinic visit; and 4) random differences between the two observers. It is impossible from these data to estimate the relative importance of these sources of error (except perhaps for the last). Consequently, high reliability coefficients can be interpreted as evidence for the robustness of the measurement procedure, but low coefficients are difficult to interpret at all.

Teaching Reliability. Tables 4, 5, and 6 report the reliability of the Teaching Scales. In Table 4 (as in Table 1 previously) the two tasks were considered as samples of the same behavior. As with the interobserver reliability estimates this assumption seemed questionable in retrospect. Consequently, the coefficients reported in Table 5 were computed separately for the two tasks. In this case little overall increase in the coefficients was noted. However, it is obvious that the hard task is somewhat more reliably observed than the easy task.

Table 4.6 reports the reliability of the summary cluster scores. The coefficients reported here, although higher than those for individual items, are nonetheless considerably lower than those for the same clusters on their interobserver reliability. As explained above, it is not possible to isolate the cause of these relatively low coefficients.

Feeding Reliability. Tables 6 and 7 report the reliability of the Feeding Scales. As in the interobserver reliability computations, milk and solid food feedings were considered separately in Table 6. Table 7 reports the coefficients for the total scores.

Discussion. Taken by themselves, the test-retest reliability coefficients are not what we might hope for from an experimental point of view. However, given the orientation of the present work and the emphasis on maintaining a naturalistic focus, with goals of application, one should not set unrealistic expectations. Given the multiple sources of error between the two sets of scores being compared, it is very likely overly optimistic to expect them to be any higher. The best interpretation of these coefficients is probably that they represent a lower boundary of the "true" reliability of the scores; any procedure which reduces or eliminates one or more of the sources of error would surely result in higher coefficients.

At the same time, these coefficients should be seen as useful and informative in focusing on some of the sources of error in actual application of these scales, and can be used in examiner/observer training schemes, thus making some practical use of our awareness of potential error sources. Taken in this sense, these coefficients represent a respectable level of measurement accuracy.

## APPENDIX 4.6 (continued)

### Table 1

### INTEROBSERVER RELIABILITY COEFFICIENTS FOR TEACHING SCALE ITEMS (INTRACLASS CORRELATIONS FOR HARD AND EASY TASKS COMBINED)

| Item | 1 mo. | 4 mo. | 8 mo. | 12 mo. |
|---|---|---|---|---|
| INFANT | | | | |
| 1 Initial State | .38 | .18 | .66 | .51 |
| 2 Displeasure | .46 | .20 | .10 | .57 |
| 3 Responsiveness | .58 | .51 | .37 | .75 |
| 4 Vocalization | .23 | .61 | .39 | .52 |
| 5 Success | .10 | .32 | .42 | .55 |
| 6 Intensity | .54 | .21 | .47 | .03 |
| 7 Duration | .60 | .50 | .16 | .64 |
| 8 Activity | .42 | .45 | .37 | .75 |
| 9 Alertness | .56 | .74 | .11 | .20 |
| MATERNAL | | | | |
| 10 Positive | .66 | .38 | .73 | .59 |
| 11 Negative | .08 | .21 | -0- | -0- |
| 12 Modeling | -0- | .53 | .67 | .44 |
| 13 Materials | .44 | .27 | .17 | -0- |
| 14 Position | .38 | .07 | -0- | .40 |
| 15 Directions | .58 | .68 | .51 | .66 |
| 16 Forcing | .55 | -0- | .07 | -0- |
| 17 Guidance | .25 | .25 | -0- | .40 |
| 18 Timing | .44 | .52 | .13 | .82 |
| 19 Exploratory | .65 | .13 | -0- | .76 |
| 20 Comfort | .70 | .67 | .42 | .70 |
| 21 Sensitivity | .70 | -0- | .56 | .64 |
| 22 Style | .64 | .71 | .58 | .35 |
| 23 Affection | .58 | .33 | .30 | -0- |
| 24 Disapproval | .59 | .45 | -0- | .70 |

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## APPENDIX 4.6 (continued)

### Table 2

### INTEROBSERVER RELIABILITY COEFFICIENTS FOR TEACHING SCALE ITEMS (INTRACLASS CORRELATIONS BY EASY AND HARD TASK)

| Item | Easy Task | | | | Hard Task | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 mo. | 4 mo. | 8 mo. | 12 mo. | 1 mo. | 4 mo. | 8 mo. | 12 mo. |
| INFANT | | | | | | | | |
| 1 Initial State | .66 | .15 | .46 | .46 | .71 | .20 | .43 | .20 |
| 2 Displeasure | .85 | .34 | .66 | .55 | .91 | .74 | .70 | .45 |
| 3 Responsiveness | .62 | .75 | .53 | .68 | .84 | .78 | .52 | .65 |
| 4 Vocalization | .48 | .81 | .48 | .59 | .39 | .71 | .24 | .14 |
| 5 Success | .64 | .77 | .62 | .76 | .59 | .73 | .46 | .87 |
| 6 Intensity | .76 | .52 | .21 | .03 | .80 | .54 | .36 | .51 |
| 7 Duration | .83 | .86 | .56 | .68 | .86 | .80 | .01 | .69 |
| 8 Activity | .76 | .57 | .17 | .48 | .69 | .61 | .63 | .51 |
| 9 Alertness | .87 | .75 | .20 | -0- | .80 | .73 | .05 | .54 |
| MATERNAL | | | | | | | | |
| 10 Positive | .84 | .53 | .68 | .86 | .67 | .62 | .95 | .87 |
| 11 Negative | .56 | .52 | .29 | .67 | .76 | .18 | .62 | .79 |
| 12 Modeling | .34 | .54 | .90 | .57 | .62 | .54 | .59 | .51 |
| 13 Materials | .69 | .51 | .58 | .45 | .62 | .21 | .74 | .52 |
| 14 Position | .53 | .15 | .27 | .29 | .75 | .27 | -0- | .56 |
| 15 Directions | .71 | .42 | .16 | .70 | .70 | .44 | .40 | .26 |
| 16 Forcing | .78 | .38 | .69 | .44 | .88 | .01 | .87 | .47 |
| 17 Guidance | .45 | .59 | .11 | .33 | .83 | .45 | .13 | .28 |
| 18 Timing | .59 | .60 | .54 | .64 | .70 | .46 | .67 | .59 |
| 19 Exploratory | .64 | .29 | .22 | .64 | .81 | .06 | .52 | .53 |
| 20 Comfort | .65 | .31 | -0- | .69 | .66 | .62 | .58 | .20 |
| 21 Sensitivity | .73 | -0- | .55 | .52 | .63 | .10 | .79 | .57 |
| 22 Style | .69 | .57 | .58 | .04 | .75 | .46 | .02 | .28 |
| 23 Affection | .58 | .39 | .21 | .36 | .87 | .24 | .47 | -0- |
| 24 Disapproval | .72 | .54 | -0- | -0- | .61 | .32 | -0- | .69 |
| N = | 40 | 34 | 19 | 20 | 40 | 34 | 19 | 20 |

### APPENDIX 4.6 (continued)

### Table 3

### INTEROBSERVER RELIABILITY COEFFICIENTS FOR FEEDING SCALE ITEMS (INTRACLASS CORRELATIONS BY MILK AND SOLID FEEDING)

| Item | Milk | | | Solids | | |
|---|---|---|---|---|---|---|
| | 1 mo. | 4 mo. | 8 mo. | 4 mo. | 8 mo. | 12 mo. |
| 1 Positioning | .74 | .79 | -0- | .94 | .90 | .73 |
| 2 Focus | .85 | .52 | .87 | -0- | .69 | .55 |
| 3 Kinesthetic | .80 | .77 | .92 | .85 | .73 | .62 |
| 4 Visual | .77 | .77 | .86 | -0- | .19 | -0- |
| 5 Tactile | .94 | .82 | .91 | .60 | -0- | -0- |
| 6 Verbal I | .91 | .92 | .75 | .83 | .88 | .78 |
| 7 Verbal II | .94 | .83 | .95 | .95 | .62 | .68 |
| 8 Mood | .94 | .84 | .73 | .97 | .77 | .86 |
| 9 Tension | .67 | .86 | .90 | .88 | .25 | .56 |
| 10 Responsive I | .81 | .87 | .84 | .98 | .80 | .82 |
| 11 Responsive II | .91 | .41 | -0- | .84 | .66 | .19 |
| 12 Initial State | .72 | .96 | .58 | .85 | .40 | .77 |
| 13 Predominant State | .72 | .90 | .74 | .58 | -0- | .46 |
| 14 State Changes | .42 | .42 | .58 | .83 | .57 | .89 |
| 15 Motor Activity | .77 | .91 | -0- | 1.00 | .47 | .62 |
| 16 Attentiveness | .92 | .96 | .48 | .89 | -0- | .33 |
| 17 Verbal | .79 | .60 | .74 | .96 | .60 | .74 |
| 18 Mood | .92 | .90 | .70 | 1.00 | .86 | .56 |
| 19 Tone | .88 | .98 | 1.00 | .95 | -0- | 1.00 |
| 20 Visual | .96 | .94 | -0- | .90 | .33 | .46 |
| 21 Control | .40 | .75 | -0- | .95 | .67 | .78 |
| N = | 28 | 12 | 6 | 6 | 14 | 15 |

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### APPENDIX 4.6 (continued)

### Table 4

### TEST RETEST RELIABILITY COEFFICIENTS FOR TEACHING SCALE ITEMS (HARD AND EASY TASK COMBINED)

| Item | 1 mo. | 4 mo. | 8 mo. | 12 mo. |
|---|---|---|---|---|
| INFANT | | | | |
| 1 Initial State | -0- | -0- | -0- | .27 |
| 2 Displeasure | .26 | .24 | .07 | .26 |
| 3 Responsiveness | .34 | .42 | .17 | .01 |
| 4 Vocalization | .33 | .29 | .43 | .42 |
| 5 Success | .37 | .35 | -0- | -0- |
| 6 Intensity | .26 | .11 | .46 | -0- |
| 7 Duration | .54 | .38 | -0- | .02 |
| 8 Activity | -0- | .56 | .06 | .23 |
| 9 Alertness | -0- | .30 | .15 | -0- |
| MATERNAL | | | | |
| 10 Positive | .24 | -0- | -0- | .18 |
| 11 Negative | -0- | .34 | .28 | -0- |
| 12 Modeling | -0- | .33 | -0- | .32 |
| 13 Materials | -0- | .19 | -0- | .06 |
| 14 Position | .07 | -0- | .02 | -0- |
| 15 Directions | .22 | .28 | .04 | -0- |
| 16 Forcing | -0- | -0- | -0- | .05 |
| 17 Guidance | .27 | .22 | -0- | -0- |
| 18 Timing | -0- | -0- | -0- | .05 |
| 19 Exploratory | -0- | .3[illegible] | .62 | .19 |
| 20 Comfort | .18 | -0- | .27 | .17 |
| 21 Sensitivity | -0- | .19 | .26 | .51 |
| 22 Style | .03 | -0- | .16 | .52 |
| 23 Affection | .46 | .23 | -0- | .01 |
| 24 Disapproval | .41 | .23 | -0- | .82 |

APPENDIX 4.6 (continued)

## Table 5

## TEST RETEST RELIABILITY COEFFICIENTS FOR TEACHING SCALE ITEMS (HARD AND EASY TASK SEPARATELY)

| Item | Easy Task 1 mo. | 4 mo. | 8 mo. | 12 mo. | Hard Task 1 mo. | 4 mo. | 8 mo. | 12 mo. |
|---|---|---|---|---|---|---|---|---|
| INFANT | | | | | | | | |
| 1 Initial State | -0- | -0- | -0- | .15 | -0- | -0- | .02 | .26 |
| 2 Displeasure | -0- | .05 | .09 | .44 | .42 | .10 | .25 | .20 |
| 3 Responsiveness | .04 | .38 | .01 | .10 | .23 | .17 | .21 | -0- |
| 4 Vocalization | -0- | .06 | .20 | .26 | .48 | .03 | .23 | .28 |
| 5 Success | .20 | .13 | -0- | .24 | .19 | .42 | .17 | .14 |
| 6 Intensity | .02 | .43 | .23 | -0- | .32 | .13 | .19 | -0- |
| 7 Duration | .20 | .42 | .01 | .45 | .30 | .32 | -0- | -0- |
| 8 Activity | -0- | .60 | -0- | .13 | -0- | .30 | .13 | .23 |
| 9 Alertness | .03 | .34 | .15 | -0- | -0- | -0- | .16 | -0- |
| MATERNAL | | | | | | | | |
| 10 Positive | .07 | -0- | -0- | .18 | .29 | .64 | .68 | .17 |
| 11 Negative | .09 | .23 | -0- | .30 | -0- | .22 | .47 | .09 |
| 12 Modeling | .09 | .01 | .16 | .28 | -0- | .25 | .24 | .25 |
| 13 Materials | -0- | .05 | -0- | -0- | -0- | .19 | .01 | .09 |
| 14 Position | -0- | -0- | .03 | -0- | .19 | -0- | .07 | .01 |
| 15 Directions | .26 | .10 | -0- | -0- | .06 | .03 | .25 | .15 |
| 16 Forcing | .16 | -0- | -0- | .38 | .60 | -0- | .38 | .25 |
| 17 Guidance | .41 | .10 | -0- | -0- | .37 | .02 | -0- | -0- |
| 18 Timing | -0- | .10 | -0- | .10 | .08 | .03 | -0- | -0- |
| 19 Exploratory | -0- | .26 | .27 | -0- | .25 | .11 | .65 | .31 |
| 20 Comfort | -0- | -0- | -0- | .08 | .26 | .20 | .28 | .22 |
| 21 Sensitivity | .10 | .22 | -0- | .44 | -0- | .27 | .42 | .50 |
| 22 Style | .07 | -0- | .16 | .14 | .21 | -0- | -0- | .61 |
| 23 Affection | .53 | .34 | .31 | -0- | .36 | .11 | -0- | .13 |
| 24 Disapproval | .26 | -0- | -0- | 1.00 | .20 | .19 | -0- | .55 |
| N = | 23 | 29 | 27 | 25 | 23 | 29 | 27 | 25 |

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APPENDIX 4.6 (continued)

## Table 6

## TEST RETEST RELIABILITY COEFFICIENTS FOR FEEDING SCALE ITEMS

| Item | Milk 1 mo. | 4 mo. | 8 mo. | Solids 4 mo. | 8 mo. | 12 mo. |
|---|---|---|---|---|---|---|
| 1 Positioning | -0- | -0- | .49 | .58 | .74 | .14 |
| 2 Focus | .33 | .10 | -0- | -0- | .51 | .49 |
| 3 Kinesthetic | .48 | -0- | -0- | .77 | .53 | .50 |
| 4 Visual | -0- | .15 | .59 | .33 | -0- | .63 |
| 5 Tactile | .64 | .34 | .52 | .46 | .43 | .60 |
| 6 Verbal I | .75 | .79 | .17 | .52 | .66 | .65 |
| 7 Verbal II | .43 | .79 | -0- | .70 | .76 | .48 |
| 8 Mood | .36 | -0- | -0- | .77 | .06 | .59 |
| 9 Tension | -0- | .60 | .40 | .32 | .15 | .09 |
| 10 Responsive I | -0- | .18 | .52 | .95 | .27 | .35 |
| 11 Responsive II | .14 | -0- | .23 | -0- | -0- | -0- |
| 12 Initial State | .03 | -0- | -0- | -0- | .45 | -0- |
| 13 Predominant State | .24 | .39 | .67 | -0- | -0- | .30 |
| 14 State Changes | .25 | -0- | -0- | .64 | .67 | .45 |
| 15 Motor Activity | -0- | .21 | -0- | -0- | .15 | .73 |
| 16 Attentiveness | .10 | .45 | -0- | -0- | .12 | .24 |
| 17 Verbal | -0- | .33 | .58 | -0- | .74 | .58 |
| 18 Mood | .25 | .46 | -0- | .07 | -0- | .68 |
| 19 Tone | -0- | .44 | -0- | -0- | -0- | -0- |
| 20 Visual | .48 | .48 | .56 | -0- | .21 | .19 |
| 21 Control | .17 | .26 | .11 | -0- | .06 | .28 |
| N = | 31 | 24 | 8 | 7 | 23 | 23 |

APPENDIX 4.6 (continued)

Table 7

TEST RETEST RELIABILITY COEFFICIENTS FOR TOTAL FEEDING SCORES

| | Mother | | Infant | |
|---|---|---|---|---|
| | r | N | r | N |
| 1 month | .21 | 31 | .01 | 25 |
| 4 months | .67 | 24 | .44 | 21 |
| 8 months | .38 | 23 | .28 | 23 |
| 12 months | .25 | 22 | .20 | 23 |

## APPENDIX 4.7

## CONSISTENCY OVER TIME FOR VARIABLES FROM TEACHING RATING SCALES (EASY AND HARD TASKS) AT 1, 4, 8, 12 MONTHS

| Variable | | MATERNAL | | | | | |
|---|---|---|---|---|---|---|---|
| | | Easy Task | | | Hard Task | | |
| | | 4 mo. | 8 mo. | 12 mo. | 4 mo. | 8 mo. | 12 mo. |
| Positive Messages | 1 Month | .17* | .28* | .12* | .24* | .28* | .13* |
| | 4 Months | | .23* | .13* | | .22* | .10* |
| | 8 Months | | | .24* | | | .25* |
| Negative Messages | 1 Month | .14* | .21* | .07 | .06 | .15* | -.01 |
| | 4 Months | | .01 | .06 | | .15* | .08 |
| | 8 Months | | | .09 | | | .17* |
| Techniques | 1 Month | .05 | .07 | -.15* | .11* | .13* | .14* |
| | 4 Months | | .08 | .02 | | .17* | .21* |
| | 8 Months | | | .01 | | | .16* |
| Facilitation | 1 Month | .15* | .07 | .12* | .09 | .12* | .14* |
| | 4 Months | | .16* | .07 | | .17* | .12* |
| | 8 Months | | | .18* | | | .03 |
| Disbrow Score | 1 Month | .09 | .07 | -.01 | .21* | .15* | .07 |
| | 4 Months | | .11* | .12* | | .15* | .12* |
| | 8 Months | | | .23* | | | .09 |
| Verbal Style | 1 Month | .24* | .09* | -.05 | .28* | .17* | .11* |
| | 4 Months | | .17* | .11* | | .23* | -.06 |
| | 8 Months | | | .08 | | | -.03 |
| Exploration | 1 Month | -.08 | .06 | .06 | .03 | .17* | .13* |
| | 4 Months | | -.07 | .00 | | .13* | .18* |
| | 8 Months | | | .15* | | | .21* |
| Comfort | 1 Month | -.02 | .07 | -.08 | .08 | .15* | .08 |
| | 4 Months | | .22* | .05 | | .15* | -.03 |
| | 8 Months | | | .24* | | | -.11* |

| Variable | | INFANT | | | | | |
|---|---|---|---|---|---|---|---|
| | | Easy Task | | | Hard Task | | |
| | | 4 mo. | 8 mo. | 12 mo. | 4 mo. | 8 mo. | 12 mo. |
| Readiness to Learn | 1 Month | .13* | .10* | .03 | .08 | .05 | .17* |
| | 4 Months | | .02 | .03 | | .07 | .13* |
| | 8 Months | | | .11* | | | .06 |
| Disbrow Score | 1 Month | .20* | .06 | .07 | .08 | .03 | .06 |
| | 4 Months | | .01 | .02 | | .11* | .12* |
| | 8 Months | | | -.06 | | | .05 |
| Initial Stage | 1 Month | -.08 | -.04 | -.06 | .16* | .05 | -.10* |
| | 4 Months | | .01 | .13 | | .15* | .06 |
| | 8 Months | | | .22* | | | .13* |
| Displeasure | 1 Month | .08 | -.01 | -.02 | .02 | .10 | -.03 |
| | 4 Months | | .19* | -.05 | | .06 | -.06 |
| | 8 Months | | | .03 | | | .00 |
| Verbal | 1 Month | .02 | .05 | .18* | .07 | .12* | .04 |
| | 4 Months | | .00 | -.08 | | .16* | .03 |
| | 8 Months | | | -.03 | | | .04 |
| Success | 1 Month | .02 | .04 | -.20* | .02 | -.07 | -.01 |
| | 4 Months | | -.05 | .02 | | .08 | .14* |
| | 8 Months | | | .02 | | | .06 |
| Activity | 1 Month | .05 | .06 | .04 | .07 | -.02 | .02 |
| | 4 Months | | -.10* | .03 | | -.03 | .04 |
| | 8 Months | | | .08 | | | .07 |

*Kendall Correlation Coefficients; $p \leq .05$; Range of N=81-164. (N's below 100 are associated with Exploratory).

A = 180, E = 9, 0 = 79.

## APPENDIX 4.8

## CORRELATIONS AMONG VARIABLE SETS FROM TEACHING RATING SCALES (EASY AND HARD TASKS)[1]

### ONE MONTH

| | Maternal | | | | | Infant | |
|---|---|---|---|---|---|---|---|
| | Positive Messages | Negative Messages | Techniques | Facilitation | Disbrow Score | Readiness To Learn | Disbrow Score |
| MATERNAL | | | | | | | |
| Positive Messages | | .03 | .01 | .33* | .45* | .22* | -.23* |
| Negative Messages | .03 | | .03 | -.15* | -.28* | -.09* | .05 |
| Techniques | .01 | .09 | | -.02 | -.15* | .01 | -.03 |
| Facilitation | .35* | -.10 | .02 | | .60* | .38* | -.26* |
| Disbrow Score | .46* | -.26* | -.22* | .63* | | .33* | -.26* |
| INFANT | | | | | | | |
| Readiness To Learn | .37* | .08 | .02 | .40* | .31* | | -.65* |
| Disbrow Score | -.30* | -.11 | -.06 | -.26* | -.18* | -.64 | |

### FOUR MONTHS

| | Maternal | | | | | Infant | |
|---|---|---|---|---|---|---|---|
| | Positive Messages | Negative Messages | Techniques | Facilitation | Disbrow Score | Readiness To Learn | Disbrow Score |
| MATERNAL | | | | | | | |
| Positive Messages | | .05 | .22* | .18* | .28* | .09 | -.26* |
| Negative Messages | .11* | | .28* | -.19* | -.39* | -.13* | -.13* |
| Techniques | .13* | .20* | | -.18* | -.25* | -.13* | -.17* |
| Facilitation | .23* | -.13* | -.12* | | .58* | .39* | -.09* |
| Disbrow Score | .33* | -.30* | -.21* | .59* | | .30* | -.07 |
| INFANT | | | | | | | |
| Readiness To Learn | .22* | -.04 | -.11* | .40* | .29* | | -.30* |
| Disbrow Score | -.20* | -.17* | -.05 | -.17* | -.10 | -.39* | |

[1] Coefficients above diagonal apply to Easy Task, coefficients below diagonal apply to Hard Task.

*Kendall Correlation Coefficients; $p < .05$; Range of N=138-178.

APPENDIX 4.8 (continued--page 2)

CORRELATIONS AMONG VARIABLE SETS FROM TEACHING RATING SCALES (EASY AND HARD TASKS)[1]

EIGHT MONTHS

| | Maternal | | | | | Infant | |
|---|---|---|---|---|---|---|---|
| | Positive Messages | Negative Messages | Techniques | Facilitation | Disbrow Score | Readiness To Learn | Disbrow Score |
| MATERNAL | | | | | | | |
| Positive Messages | | -.04 | .22* | .21* | .29* | .00 | -.12* |
| Negative Messages | -.19* | | .21* | -.26* | -.35* | -.20* | .02 |
| Techniques | .07 | .14* | | -.18* | -.13* | -.14* | -.11* |
| Facilitation | .28* | -.27* | .02 | | .65* | .37* | .02 |
| Disbrow Score | .41* | -.44* | -.22* | .56* | | .29* | -.01 |
| INFANT | | | | | | | |
| Readiness To Learn | .20* | -.12* | .13* | .23* | .12 | | -.13* |
| Disbrow Score | -.25* | -.06 | -.14* | -.17* | -.08 | -.51* | |

TWELVE MONTHS

| | Maternal | | | | | Infant | |
|---|---|---|---|---|---|---|---|
| | Positive Messages | Negative Messages | Techniques | Facilitation | Disbrow Score | Readiness To Learn | Disbrow Score |
| MATERNAL | | | | | | | |
| Positive Messages | | -.04 | .08 | .26* | .32* | .14* | -.11* |
| Negative Messages | -.18* | | .34* | -.33* | -.43* | -.33* | -.14* |
| Techniques | -.02* | .18* | | -.19* | -.35* | -.31* | -.10* |
| Facilitation | .39* | -.30* | -.13* | | .58* | .33* | -.03 |
| Disbrow Score | .48* | -.44* | -.39* | .60* | | .34* | -.04 |
| INFANT | | | | | | | |
| Readiness To Learn | .31* | -.16* | -.09 | .24* | .28* | | -.05 |
| Disbrow Score | -.19* | -.00 | -.15* | -.08 | -.04 | -.29* | |

[1] Coefficients above diagonal apply to Easy Task, coefficients below diagonal apply to Hard Task.

*Kendall correlation coefficients; $p < .05$; Range of N=144-162.

## APPENDIX 4.9

## CORRELATIONS BETWEEN EASY AND HARD TASKS FOR VARIABLES FROM TEACHING RATING SCALES AT 1, 4, 8, 12 MONTHS

| Teaching Scale Variables (Easy and Hard Tasks) | 1 mo. | 4 mo. | 8 mo. | 12 mo. |
|---|---|---|---|---|
| MATERNAL | | | | |
| Positive Messages | .40* | .39* | .31* | .39* |
| Negative Messages | .49* | .44* | .27* | .31* |
| Techniques | .31* | .31* | .16* | .21* |
| Facilitation | .48* | .37* | .32* | .49* |
| Style of Interaction | .51* | .59* | .41* | .51* |
| Exploratory | .38* | .42* | .24* | .64* |
| Comfort | .61* | .63* | .34* | .39* |
| Disbrow Score | .36* | .40* | .24* | .45* |
| INFANT | | | | |
| Readiness to Learn | .33* | .40* | .23* | .32* |
| Initial State | .18* | .55* | .54* | .65* |
| Displeasure | .33* | .32* | .19* | .24* |
| Verbal | .43* | .54* | .40* | .43* |
| Success | .01 | .21* | .10* | .28* |
| Activity | .52* | .52* | .29* | .32* |
| Disbrow Score | .28* | .35* | .14* | .18* |

*Kendall Correlation Coefficients; $p < .05$; Range of N = 95-177 (N below 100 is associated with exploratory at 1 mo.).

# APPENDIX 4.10

UNIVERSITY OF WASHINGTON
School of Nursing
NURSING CHILD ASSESSMENT PROJECT

## FEEDING SCALES

## MATERNAL

### A. POSITION

1. Position of infant is unsafe. Difficult for adequate intake and digestion. Interaction impossible.
2. Infant may be uncomfortable, unsafe, and/or placed in a position in which interaction with the mother is difficult to establish.
3. Positioning provides adequate safety for infant, but less than optimal for interaction.
4. Mother positions infant in an age-appropriate, safe, and comfortable position. In order to do this, she must take into account the child's developmental level, his/her individual patterns of reaction, and his/her individual food intake patterns. The positioning and support are flexible and relaxed enough to provide comfort, freedom, and opportunity for age-appropriate exploratory and/or self-help activities. The mother places herself in an 'en fas' position, which means that her face is in such a position that her eyes and those of the infant meet fully in the same vertical and horizontal plane of rotation. In the case of breast-fed infants, the 'en fas' position is unable to be established. The breast-fed mother attempts for the most part to assume a similar alignment with the child.
5. Mother positions infant to provide more support than is necessary which tends to interfere with infant's comfort or exploratory activity.
6. Mother's positioning results in the child being uncomfortable, and hinders a child's opportunities for exploratory behavior.
7. Mother positions infant so he is completely immobilized and uncomfortable.

### B. FOCUS

1. Complete inattention to situation. Due to innattentiveness (distracted or diffuse focus) mother totally misses infant's needs for rest or burping, time-outs.
2. Mother is easily distracted from the feeding by extraneous events; attentive only to infants potent demands. (crying, fussing, sucking and rooting vigorously)
3. Mother is at times distracted momentarily, but focuses mostly on the situation. Is attentive to both potent and subtle demands made by the infant in his need for rest, time out, or burping.
4. Mother is focused on the feeding and does not engage in distracting activities such as talking on the phone, intensive or intrusive play, etc. She is well aware of the infant's demands and needs and establishes a rhythm in which periodic rests, burps and socializing are an integral part. She is not overly concerned with the amount of food ingested by the infant.
5. Mother perseveres with the feeding and attentive to the situation; picks up on potent demands but seems to miss most of the subtle cues or demands for rests or burps, etc. (squirms, head turning, closed eyes)
6. Mother rarely rests or burps infant when needed -- only on getting food into the infant.
7. Mother is so focused and locked into the task at hand that she misses the demands and needs of the infant for pauses, rests, burps, etc. Bombards with food.

### C. KINESTHETIC

0. Not applicable - e.g. infant positioned so as to preclude appropriate opportunities for kinesthetic stimulation.
1. No kinesthetic stimulation.
2. Minimal amount of kinesthetic stimulation as appropriate for age.
3. Some kinesthetic stimulation as appropriate for age.
4. Position movement for burping, rocking, and position change; motion variable; intensity age-appropriate.
5. Much kinesthetic stimulation as appropriate for age.
6. Excessive amount of kinesthetic provided as appropriate for age.
7. Kinesthetic stimulation continuous, obligatory, nonpurposeful in regard to infant.

### D. VISUAL

1. Mother doesn't look at baby at all.
2. Rarely regards infant at all, doesn't attend for chances for eye-to-eye contact since she misses cues from the infant.
3. Visually regards infant and may establish eye-to-eye contact once or twice, misses some obvious opportunities for further eye-to-eye contact.
4. Visually utilizes self to stimulate infant as appropriate for age. Visually regards infant and establishes eye-to-eye contact frequently or when the opportunity presents itself. Mutual pause and fixation characteristic.
5. Visual regard more concentrated, somewhat insensitive to infant in her attempts to establish eye-to-eye contact.
6. Concentrated visual regard modulated only by potent cues from the infant. If eye-to-eye contact is established, it occurs in awkward ways.
7. Constant surveillance of infant eye contact may be observed.

### E. TACTILE

0.
1. No tactile stimulation.
2. Very little tactile stimulation provided, one or two isolated instances of affectionate or functional touch occur.
3. Some tactile stimulation provided shows awareness of infants state and needs.
4. Tactile mode of stimulation utilized effectively by mother to create interaction with her infant; affectionate touching occurs at points during the feeding that do not interfere with infants sucking; intensity variable and in accord with activity.
5. Much tactile stimulation showing awareness of infants states and needs.
6. Excessive use of tactile stimulation.
7. Tactile stimulation obligatory, continuous and nonpurposeful.

# APPENDIX 4.10 (continued--page 2)

## F. VERBAL I

1. No attempts to verbally stimulate infant.
2. Few attempts to verbally stimulate infant; verbalizations are rarely contingent on infant's cues.
3. Somewhat fewer verbalizations than would appear optimal; some verbalizations contingent on infant's cues appropriate for age.
4. Mother reads infant's cues well and communicates thus verbally to the infant; she utilizes well opportunities to verbally stimulate the infant taking into account his'state. Her verbalizations are contingent on the infant's cues as appropriate for age. (see examples)
5. Somewhat more verbalizations than would appear optimal; some verbalizations contingent on the infant's cues as appropriate for age.
6. Excessive use of verbal stimulation by the mother; verbalizations are rarely contingent on infant's cues.
7. Almost continuous use of verbal stimulation -- intermittent contingencies may occur.

## G. VERBAL II

0. No verbalizations preclude variations in type and quality.
1. No variations in type and/or quality of verbal stimulation.
2. Little variation in type and/or quality of verbal stimulation.
3. Some variation in type and/or quality of verbal stimulation showing awareness of infants cues, state or needs.
4. Provides a variety of age-appropriateness types of verbal stimulation and varies in pitch and intensity in accordance with infants state and needs.
5. Frequent variations in type and/or quality of verbalizations showing awareness of infants state needs and cues.
6. Very frequent variations in type and/or quality of verbal stimulation.
7. Excessive variation in type and/or quality of verbal stimulation.

## H. MOOD

1. Lack of affect or emotional expression and/or feeling tone.
2. Lack of affect and/or emotional expression characteristic. Spurts of emotion or feeling are present occasionally.
3. Emotion and affect or feeling tone present most of the time; however, there is a slight tendency to fall off and/or fail to show the appropriate mood change or affect.
4. Emotional responsivity permeates. Mother's feeling tone is in a sense empathic and responds with an affect and emotion, and compliments infant's state and needs.
5. Emotion, affect and feeling tone present most of the time; a tendency to be over intense occurs on one or two occasions, however.
6. Intense emotion, affect and feeling pervade; shooting off of emotion characteristic.
7. Expression of intense emotion and/or affect and feeling characteristic.

## I. TENSION

1. Lack of tension. Exhausted and/or mechanized movements characteristic. Doing not responding.
2. Too relaxed. Responsive only to the potent cues of the infant.
3. Relaxation characteristic of the situation. Responsive to most cues, potent and subtle.
4. Dynamic tension equilibrium established as evidenced in body movements, facial expression, and vocalizations. Quick in action, but not hasteful. Balance between relaxation and tension maintained dynamically.
5. More tense than relaxed. Ability to respond to infant's cues hampered in only a few instances.
6. Too tense. Movements are jerky (as opposed to smooth), shifty, or rapid movements are characteristic. Tenseness begins to interfere with and/or inhibit her responsiveness to infant.
7. Extremely tense. Almost all responsiveness to infant is inhibited.

## J. RESPONSE I

0. No distress signals.
1. No attempt to alleviate infant's distress.
2. Attempts to alleviate distress only after a very long period of time elapses.
3. Somewhat longer latency than necessary in attempting to alleviate infant's distress.
4. Moderate latency between infant's distress signal and mother's response; shows awareness of infant's state.
5. Somewhat shorter latency than necessary.
6. Very short latency to infant's signals of distress.
7. Immediate response to infant's distress continuously.

## K. RESPONSE II

0. Infant gives off no cues that are apparent to the observer.
1. Mother ignores cues that infant is satiated and continues to force feed.
2. Mother's response to satiation quite delayed and continues to feed infant even though satiation cues are obvious.
3. Mother recognizes infant's satiation cues and delays her termination response for a short time.
4. Mother recognizes infant's satiety and terminates the feeding promptly, e.g., she makes sure the infant is satiated; attempts to give infant nipple to make certain.
5. Upon recognizing infant's cues of satiation, she terminates the feeding immediately.
6. Mother interprets distress or obvious cues as satiation cues and terminates, although infant is still obviously hungry.
7. Interprets most cues as satiation cues; feeding period is characterized by frequent stops and starts.

# APPENDIX 4.10(continued--page 3)

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## FEEDING SCALES

## INFANT

### A. INITIAL STATE
(when mother starts to feed)

1. Deep sleep.
2. Light sleep with eyes closed.
3. Eyes may be open or closed, eyelids fluttering, drowsy or semi-dozing.
4. Alert look; doesn't seem to focus attention on source of stimulation.
5. Alert, bright look; seems to focus attention on source of stimulation.
6. Eyes open, considerable motor activity...perhaps some fussing.
7. Crying with or without motor activity.

### B. PREDOMINANT STATE
(select one)

1. Deep sleep.
2. Light sleep with eyes closed.
3. Eyes may be open or closed, eyelids fluttering, drowsy or semi-dozing.
4. Alert look; doesn't seem to focus attention on source of stimulation.
5. Alert, bright look; seems to focus attention on source of stimulation.
6. Eyes open, considerable motor activity...perhaps some fussing.
7. Crying with or without motor activity.

### C. RATE OF STATE CHANGE
Number of state changes during feeding. (Must be 2 states removed to count as one state change, e.g. a 5 to 7, etc.)

1. Deep sleep.
2. Light sleep with eyes closed.
3. Eyes may be open or closed, eyelids fluttering, drowsy or semi-dozing.
4. Alert look; doesn't seem to focus attention on source of stimulation.
5. Alert, bright look; seems to focus attention on source of stimulation.
6. Eyes open, considerable motor activity...perhaps some fussing.
7. Crying with or without motor activity.

### D. MOTOR ACTIVITY

1. Few instances of motor activity occur, stays quietly in one place.
2. Low level of spontaneous and elicited activity in response to direct stimulation.
3. Characteristically the infant is motorically quiet in spontaneous activity but has more motor activity in response to stimulation (elicited).
4. Moderate in activity with fluctuations characteristics; spontaneous as well as elicited present; motor responses in control.
5. Higher level of spontaneous activity characteristic, responds with motor activity to most stimulation provided by the mother.
6. Very high level of spontaneous and elicited activity in response to stimulation.
7. Motor activity in excess to almost all stimuli presented, difficult to decipher spontaneous from elicited.

### E. ATTENTIVENESS

1. Does not give up feeding to attend to mother's socialization; too disinterested, sleepy to go back to feeding once it's been interrupted.
2. Indifferent, difficulty in attending to feeding and/or interaction attempts by mother.
3. Alert and attentive some of the time; may be easily brought back into interaction with mother when infant becomes sleepy or disinterested; not easily distracted by environmental stimuli.
4. Attentive, alert, able to respond and attend to mother's cues, and is available to feeding and interaction alternately.
5. Alert and attentive most of the time, more difficult to bring back into interaction with mother; more easily distracted by environmental stimuli.
6. Very distracted, difficulty in attending to feeding and/or interaction attempts by mother.
7. Completely distracted; unable to attend to the ongoing interaction.

### F. VERBAL

1. No vocalizations other than crying.
2. Few vocalizations, mainly during feeding (sucking, gurgling noises, no approximations to speech sounds); few contingent vocalizations (at 8 and 12 months).
3. Some vocalizing during pauses in feeding; occasional contingent vocalizations (at 8 and 12 months).
4. Utilizes pauses in feeding for vocalizing; contingent vocalizations (at 8 and 12 months; uses age-appropriate types of vocalizations.
5. Frequent vocalizations; frequent contingent vocalizations (at 8 and 12 months).
6. Very frequent vocalizations during feeding as well as in pauses, at times interfering with interactions.
7. Excessive amount of vocalization, often interfering or overriding mother-infant interaction.

## APPENDIX 4.10(continued--page 4)

### G. MOOD

1. Complete lack of affect, emotional expression or feeling tone.
2. Lack of affect, emotional expression. Spurts of emotion are present occasionally.
3. Emotion, affect, feeling tone present and displayed most of the time at low key.
4. Emotional responsiveness permeates. Infant responds and displays affect, emotion or feeling spontaneously and in response to stimulation. In alert periods displays some type of affect.
5. Emotion, affect, feeling tone present most of the time; there exists a tendency to be over intense at times.
6. Intense emotion, affect, and feeling pervade; shooting off emotion may be seen.
7. Expression of intense emotion, feeling; sustained affect.

### H. TENSION

1. Flaccid, limp, little response to being held, moved or stimulated.
2. Flaccid, limp most of the time, but is responsive with tone when handled by the mother about 25% of the time.
3. Tone when handled, fairly flaccid state in between stimulation, handling.
4. Variable tone, responsive to stimulation with good tone as he is stimulated 75% of the time.
5. Is on the hypertonic side when stimulated approximately 50% of the time.
6. Responds with hypertonicity about 75% of the time when stimulated, handled.
7. Hypertonic all the time - legs stiff, arched back, etc., characteristic.

### I. VISUAL

0. Not applicable (infant positioned so as to preclude visual regard of face and eyes or eyes closed during the feeding).
1. Doesn't look at mother at all.
2. Eyes open, no focus on mother's face.
3. Some contact with mother's face, eyes.
4. Visually regards mother's face and focuses on eyes when possible.
5. Frequent contact with mother's face.
6. Constant surveillance of mother's face or eyes.
7. Fixated, hypnotized by mother's face, eyes.

### J. CONTROL

1. Mother is totally dependent on infant. The infant exerts his control over the situation through his autonomous acts. Mother fails to guide/direct behavior.
2. Mother is not totally dependent on the infant; she exercises direction in one or two instances in spite of autonomous activity.
3. The infant still seems to be the most influential exerting his control through isolated autonomous acts; however, the mother makes opportunities to direct/guide/shape behavior in spite of his activity.
4. A balance in control is operating, each being dependent on the other to some extent; the mother gives the infant opportunities to explore and master, and the infant allows the mother opportunities for shaping/teaching/directing.
5. Mother is most influential in her direction and guidance of the infant most of the time; the infant, however, is allowed some time to explore/master during the feeding.
6. Infant is pretty much dependent on the mother. She allows few opportunities or instances for exploring/mastery during the feeding. Exerts control through her restrictiveness.
7. Infant totally dependent on the mother. Mother completely dominates the situation through her direction and restriction in not allowing any autonomous acts (exploring/mastery).

## APPENDIX 4.11

## DISTRIBUTIONS OF SCALE POINTS ON ONE MONTH MILK FEEDING SCALES

| Scale Items | Scale Points 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Maternal Scales | | | | | | | |
| Positioning | 0 | 1.6 | 40.0 | 48.9 | 7.1 | 1.6 | 0.5 |
| Focus | 0 | 6.6 | 33.0 | 50.5 | 7.7 | 2.2 | 0 |
| Kinesthetic | 0.5 | 10.4 | 20.9 | 53.3 | 11.0 | 2.7 | 1.1 |
| Visual | 0 | 2.2 | 33.1 | 54.1 | 7.2 | 2.2 | 1.1 |
| Tactile | 0.5 | 9.9 | 27.5 | 49.5 | 9.3 | 2.7 | 0.5 |
| Verbal - Amount | 6.0 | 18.7 | 31.3 | 37.9 | 1.6 | 3.3 | 1.1 |
| Verbal - Quality | 9.9 | 18.0 | 28.5 | 38.4 | 3.5 | 1.7 | 0 |
| Mood | 2.7 | 8.2 | 20.3 | 58.8 | 7.7 | 1.6 | 0.5 |
| Tension | 0.6 | 1.7 | 7.7 | 50.8 | 32.6 | 6.6 | 0 |
| Response-Distress | 0 | 0 | 17.9 | 62.6 | 10.6 | 7.3 | 1.6 |
| Response-Satiation | 0 | 6.9 | 13.8 | 50.0 | 20.7 | 6.3 | 2.3 |
| Infant Scales | | | | | | | |
| Initial State | 0 | 0.6 | 2.2 | 17.3 | 33.0 | 32.4 | 14.5 |
| Predominant State | 0 | 2.8 | 36.1 | 29.4 | 31.7 | 0 | 0 |
| Motor Activity | 3.3 | 20.4 | 41.4 | 28.2 | 6.1 | 0.6 | 0 |
| Attentiveness | 1.6 | 8.8 | 34.6 | 48.9 | 6.0 | 0 | 0 |
| Verbal | 13.7 | 54.9 | 14.8 | 13.7 | 1.6 | 1.1 | 0 |
| Mood | 0.5 | 11.0 | 36.8 | 41.2 | 7.7 | 2.2 | 0.5 |
| Tone | 0.5 | 2.7 | 22.5 | 65.4 | 7.1 | 1.6 | 0 |
| Visual | 5.1 | 13.0 | 39.0 | 33.9 | 6.8 | 2.3 | 0 |
| Control | 0 | 3.9 | 16.0 | 43.1 | 28.2 | 7.7 | 1.1 |

APPENDIX 4.11 (continued--page 2)

DISTRIBUTIONS OF MATERNAL SCALE POINTS ON FOUR MONTH
MILK AND SOLID FEEDING SCALES

| Scale Items | Scale Points 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Maternal Scales (Milk) | | | | | | | |
| Positioning | 0.6 | 7.6 | 45.6 | 41.1 | 5.1 | 0 | 0 |
| Focus | 0.6 | 13.3 | 28.5 | 44.3 | 7.0 | 5.1 | 1.3 |
| Kinesthetic | 2.6 | 17.9 | 21.8 | 48.1 | 7.7 | 1.3 | 0.6 |
| Visual | 1.9 | 6.3 | 41.1 | 34.2 | 10.1 | 4.4 | 1.9 |
| Tactile | 3.2 | 12.0 | 29.7 | 41.1 | 8.9 | 4.4 | 0.6 |
| Verbal-Amount | 7.0 | 23.4 | 33.5 | 26.6 | 5.7 | 3.2 | 0.6 |
| Verbal-Quality | 10.9 | 17.0 | 26.5 | 39.5 | 4.1 | 1.4 | 0.7 |
| Mood | 1.3 | 9.5 | 26.6 | 50.0 | 10.1 | 1.3 | 1.3 |
| Tension | 0 | 3.2 | 8.9 | 46.2 | 33.5 | 7.6 | 0.6 |
| Response-Distress | 2.7 | 4.4 | 14.2 | 57.5 | 9.7 | 7.1 | 4.4 |
| Response-Satiation | 0 | 5.3 | 11.5 | 54.2 | 18.3 | 4.6 | 6.1 |
| Maternal Scales (Solid) | | | | | | | |
| Positioning | 2.3 | 10.3 | 28.7 | 42.5 | 12.6 | 2.3 | 1.1 |
| Focus | 0 | 2.3 | 17.2 | 35.6 | 18.4 | 14.9 | 11.5 |
| Kinesthetic | 20.7 | 25.9 | 27.6 | 22.4 | 3.4 | 0 | 0 |
| Visual | 0 | 9.2 | 36.8 | 37.9 | 11.5 | 2.3 | 2.3 |
| Tactile | 4.7 | 19.8 | 27.9 | 24.4 | 17.4 | 5.8 | 0 |
| Verbal-Amount | 3.5 | 14.0 | 24.4 | 43.0 | 7.0 | 7.0 | 1.2 |
| Verbal-Quality | 4.8 | 11.9 | 26.2 | 47.6 | 6.0 | 2.4 | 1.2 |
| Mood | 1.1 | 3.4 | 16.1 | 56.3 | 17.2 | 4.6 | 1.1 |
| Tension | 0 | 2.3 | 6.9 | 43.7 | 36.8 | 9.2 | 1.1 |
| Response-Distress | 7.5 | 16.4 | 14.9 | 47.8 | 4.5 | 6.0 | 3.0 |
| Response-Satiation | 6.1 | 9.1 | 18.2 | 43.9 | 12.1 | 7.6 | 3.0 |

DISTRIBUTION OF INFANT SCALE POINTS ON FOUR MONTH
MILK AND SOLID FEEDING SCALES

| Scale Items | Scale Points 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Infant Scales (Milk) | | | | | | | |
| Initial State | 0 | 0 | 0 | 12.7 | 45.2 | 33.1 | 8.9 |
| Predominant State | 0 | 0 | 15.2 | 27.2 | 50.0 | 7.0 | 0.6 |
| Motor Activity | 1.3 | 3.2 | 27.2 | 43.7 | 19.0 | 5.7 | 0 |
| Attentiveness | 1.9 | 5.7 | 20.3 | 46.2 | 20.9 | 3.8 | 1.3 |
| Verbal | 10.8 | 54.4 | 22.2 | 8.9 | 1.9 | 1.9 | 0 |
| Mood | 0 | 4.4 | 28.5 | 48.7 | 12.7 | 4.4 | 1.3 |
| Tone | 0 | 0.6 | 8.2 | 69.0 | 19.0 | 2.5 | 0.6 |
| Visual | 11.0 | 14.2 | 44.5 | 23.2 | 5.2 | 1.9 | 0 |
| Control | 0.6 | 1.9 | 18.8 | 40.9 | 26.6 | 9.1 | 1.9 |
| Infant Scales (Solid) | | | | | | | |
| Initial State | 0 | 0 | 0 | 4.6 | 50.6 | 29.9 | 14.9 |
| Predominant State | 0 | 0 | 0 | 20.7 | 47.1 | 28.7 | 3.4 |
| Motor Activity | 0 | 1.1 | 6.9 | 36.8 | 37.9 | 14.9 | 2.3 |
| Attentiveness | 0 | 6.9 | 5.7 | 49.4 | 32.2 | 5.7 | 0 |
| Verbal | 14.0 | 32.6 | 18.6 | 20.9 | 9.3 | 1.2 | 3.5 |
| Mood | 0 | 0 | 9.2 | 44.8 | 29.9 | 12.6 | 3.4 |
| Tone | 0 | 1.1 | 1.1 | 62.1 | 27.6 | 6.9 | 1.1 |
| Visual | 2.3 | 11.5 | 48.3 | 31.0 | 6.9 | 0 | 0 |
| Control | 1.2 | 1.2 | 12.8 | 23.3 | 31.4 | 22.1 | 8.1 |

## APPENDIX 4.11 (continued--page 3)

### DISTRIBUTIONS OF MATERNAL SCALE POINTS ON EIGHT MONTH MILK AND SOLID FEEDING SCALES

| Scale Items | Scale Points<br>1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Maternal Scales (Milk) | | | | | | | |
| Positioning | 3.4 | 6.8 | 50.8 | 39.0 | 0 | 0 | 0 |
| Focus | 3.4 | 10.2 | 35.6 | 39.0 | 8.5 | 3.4 | 0 |
| Kinesthetic | 0 | 22.6 | 34.0 | 39.6 | 3.8 | 0 | 0 |
| Visual | 1.7 | 5.1 | 44.1 | 37.3 | 8.5 | 3.4 | 0 |
| Tactile | 11.9 | 20.3 | 30.5 | 30.5 | 5.1 | 1.7 | 0 |
| Verbal-Amount | 10.2 | 23.7 | 40.7 | 25.4 | 0 | 0 | 0 |
| Verbal-Quality | 9.3 | 24.1 | 35.2 | 31.5 | 0 | 0 | 0 |
| Mood | 5.1 | 10.2 | 25.4 | 50.8 | 8.5 | 0 | 0 |
| Tension | 0 | 6.8 | 20.3 | 49.2 | 22.0 | 1.7 | 0 |
| Response-Distress | 7.1 | 3.6 | 14.3 | 67.9 | 3.6 | 3.6 | 0 |
| Response-Satiation | 0 | 0 | 9.4 | 69.8 | 18.9 | 1.9 | 0 |
| Maternal Scales (Solid) | | | | | | | |
| Positioning | 0 | 2.1 | 13.4 | 78.9 | 2.1 | 3.5 | 0 |
| Focus | 0 | 2.8 | 21.8 | 48.6 | 20.4 | 4.2 | 2.1 |
| Kinesthetic | 28.8 | 23.7 | 28.8 | 15.3 | 3.4 | 0 | 0 |
| Visual | 0 | 4.3 | 29.8 | 56.7 | 7.1 | 2.1 | 0 |
| Tactile | 4.3 | 14.2 | 49.6 | 13.5 | 15.6 | 2.8 | 0 |
| Verbal-Amount | 0 | 15.5 | 33.8 | 42.3 | 6.3 | 0.7 | 1.4 |
| Verbal-Quality | 11.3 | 17.6 | 28.9 | 39.4 | 2.1 | 0.7 | 0 |
| Mood | 2.1 | 6.3 | 21.1 | 57.7 | 9.9 | 2.1 | 0.7 |
| Tension | 0 | 1.4 | 8.5 | 61.3 | 24.6 | 4.2 | 0 |
| Response-Distress | 2.8 | 1.4 | 9.7 | 76.4 | 4.2 | 2.8 | 2.8 |
| Response-Satiation | 0.8 | 4.9 | 9.0 | 66.4 | 14.8 | 2.5 | 1.6 |

### DISTRIBUTION OF INFANT SCALE POINTS ON EIGHT MONTH MILK AND SOLID FEEDING SCALES

| Scale Items | Scale Points<br>1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Infant Scales (Milk) | | | | | | | |
| Initial State | 0 | 0 | 1.7 | 23.7 | 54.2 | 15.3 | 5.1 |
| Predominant State | 1.7 | 0 | 12.1 | 36.2 | 41.4 | 8.6 | 0 |
| Motor Activity | 0 | 11.9 | 15.3 | 33.9 | 30.5 | 8.5 | 0 |
| Attentiveness | 1.7 | 5.1 | 15.3 | 28.8 | 39.0 | 10.2 | 0 |
| Verbal | 13.6 | 47.5 | 27.1 | 5.1 | 6.8 | 0 | 0 |
| Mood | 1.7 | 1.7 | 22.0 | 54.2 | 18.6 | 1.7 | 0 |
| Tone | 0 | 0 | 3.4 | 86.4 | 8.5 | 1.7 | 0 |
| Visual | 5.3 | 10.5 | 52.6 | 22.8 | 8.8 | 0 | 0 |
| Control | 1.7 | 1.7 | 35.6 | 42.4 | 11.9 | 6.8 | 0 |
| Infant Scales (Solid) | | | | | | | |
| Initial State | 0 | 0 | 0 | 28.9 | 47.2 | 22.5 | 1.4 |
| Predominant State | 0 | 0 | 0 | 47.1 | 43.6 | 9.3 | 0 |
| Motor Activity | 0 | 0 | 13.5 | 49.6 | 31.9 | 5.0 | 0 |
| Attentiveness | 1.4 | 9.9 | 22.5 | 55.6 | 9.2 | 0.7 | 0.7 |
| Verbal | 1.4 | 22.5 | 46.5 | 20.4 | 7.0 | 2.1 | 0 |
| Mood | 0 | 1.4 | 14.1 | 48.6 | 33.1 | 2.1 | 0.7 |
| Tone | 0 | 0 | 2.1 | 90.1 | 7.0 | 0.7 | 0 |
| Visual | 0.7 | 4.2 | 57.7 | 34.5 | 2.8 | 0 | 0 |
| Control | 0 | 4.3 | 13.5 | 40.4 | 26.2 | 12.8 | 2.8 |

## APPENDIX 4.11 (continued--page 4)

## DISTRIBUTIONS OF SCALE POINTS ON TWELVE MONTH SOLID FEEDING SCALES

| | Scale Points | | | | | | |
|---|---|---|---|---|---|---|---|
| Scale Items | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Maternal Scales | | | | | | | |
| Positioning | 0 | 0.7 | 14.4 | 83.6 | 0 | 1.4 | 0 |
| Focus | 0 | 6.8 | 24.7 | 49.3 | 17.8 | 1.4 | 0 |
| Kinesthetic | 7.9 | 34.2 | 26.3 | 26.3 | 2.6 | 2.6 | 0 |
| Visual | 0 | 0 | 23.6 | 64.6 | 10.4 | 1.4 | 0 |
| Tactile | 5.5 | 41.4 | 38.6 | 6.2 | 7.6 | 0.7 | 0 |
| Verbal - Amount | 0 | 11.0 | 29.5 | 54.8 | 4.1 | 0.7 | 0 |
| Verbal - Quality | 4.8 | 7.5 | 32.2 | 52.7 | 2.1 | 0.7 | 0 |
| Mood | 0 | 8.2 | 17.1 | 61.6 | 12.3 | 0.7 | 0 |
| Tension | 0 | 0.7 | 9.6 | 55.5 | 32.9 | 1.4 | 0 |
| Response-Distress | 8.5 | 8.5 | 15.3 | 62.7 | 1.7 | 0 | 3.4 |
| Response-Satiation | 0 | 3.0 | 13.5 | 74.4 | 9.0 | 0 | 0 |
| Infant Scales | | | | | | | |
| Initial State | 0.7 | 0 | 0 | 22.1 | 61.4 | 13.1 | 2.8 |
| Predominant State | 0 | 0 | 0 | 31.0 | 64.1 | 4.8 | 0 |
| Motor Activity | 0 | 0 | 10.3 | 61.0 | 25.3 | 3.4 | 0 |
| Attentiveness | 0 | 0.7 | 6.2 | 54.1 | 34.2 | 4.1 | 0.7 |
| Verbal | 0.7 | 11.0 | 28.1 | 39.7 | 17.8 | 2.7 | 0 |
| Mood | 0 | 1.4 | 8.9 | 58.9 | 22.6 | 8.2 | 0 |
| Tone | 0 | 0.7 | 0 | 97.3 | 2.1 | 0 | 0 |
| Visual | 0 | 2.1 | 45.9 | 49.3 | 2.7 | 0 | 0 |
| Control | 0 | 1.4 | 12.3 | 44.5 | 35.6 | 6.2 | 0 |

# APPENDIX 4.12

## METHOD FOR OBTAINING TOTAL FEEDING SCORES

Scales are folded at midpoint:

| original scale score | new scale score |
|---|---|
| 4 | 4 (optimal) |
| 3,5 | 3 |
| 2,6 | 2 |
| 1,7 | 1 (deviant) |

with the following exceptions:

1. "infant state changes" is omitted at all time points.
2. "maternal kinesthetic" and "maternal response to distress" are omitted at 8 and 12 months.
3. at 8 and 12 months "maternal ~~visual~~ Tactile" and at 1 and 4 months "infant verbal" is coded as:

| original | new |
|---|---|
| 3,4 | 4 |
| 2,5 | 3 |
| 1,6 | 2 |
| 7 | 1 |

4. at all ages "infant initial state" and "infant predominant state" are coded as:

| original | new |
|---|---|
| 5 | 4 |
| 4,6 | 3 |
| 3,7 | 2 |
| 1,2 | 1 |

Number of scales which make up score:

12 maternal at 1 and 4 months (possible range is 12 - 48)

10 maternal at 8 and 12 months (possible range is 10 - 40)

8 infant at all ages (possible range is 8 - 32)

Total score is sum of scores recoded on 4-point scale. Correction is made if less than 25% of scores were missing by dividing by the number of non-missing values and multiplying by the total required. For example, there are 10 scales which make up a score and a subject has only 9 scales with a score; if her scores on those nine scales are 4+3+2+4+2+3+4+2+3 = 27

score = $\frac{27}{9}$ x 10 = 30

DESCRIPTIVE STATISTICS FOR TOTAL FEEDING SCORES
AT 1, 4, 8 AND 12 MONTHS

| | 1 month | 4 months | 8 months | 12 months |
|---|---|---|---|---|
| MATERNAL | | | | |
| Median | 40.38 | 39.04 | 35.03 | 35.54 |
| Mean | 39.95 | 38.37 | 33.80 | 34.53 |
| S.D. | 5.40 | 6.18 | 4.75 | 3.46 |
| Range | 27.0-48.0 | 20.4-48.0 | 18.0-40.0 | 24.0-40.0 |
| N | 182 | 158 | 143 | 146 |
| Mean Scale Score | 3.33 | 3.20 | 3.38 | 3.45 |
| INFANT | | | | |
| Median | 25.98 | 27.01 | 27.01 | 28.98 |
| Mean | 25.51 | 26.38 | 27.05 | 28.44 |
| S.D. | 3.46 | 3.31 | 2.34 | 2.47 |
| Range | 13.0-32.0 | 15.0-32.0 | 20.0-32.0 | 20.0-32.0 |
| N | 181 | 158 | 143 | 146 |

APPENDIX 4.13

## DISTRIBUTION OF SUBJECTS ON HOME STIMULATION INVENTORY SUBSCALES AT 4, 8, & 12 MONTHS OF AGE

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | Median |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 Month N = 178 | | | | | | | | | | | | | |
| I Emotional & verbal responsivity | | 1 | | 1 | | 5 | 12 | 11 | 26 | 24 | 43 | 55** | 9.71 |
| II Avoidance of restriction & punishment | | | | 3 | 7 | 15 | 32 | 79 | 42** | | | | 6.90 |
| III Organization of temporal environment | | | 6 | 18 | 43 | 57 | 54** | | | | | | 4.89 |
| IV Appropriateness of Play materials | 1 | 5 | 10 | 14 | 42 | 49 | 34 | 12 | 8 | 3** | | | 4.85 |
| V Maternal involvement with child | | 6 | 13 | 19 | 25 | 37 | 78** | | | | | | 5.20 |
| VI Opportunities for variety in daily stimulation | 2 | 19 | 75 | 56 | 25 | 1** | | | | | | | 2.41 |
| 8 Month N = 162 | | | | | | | | | | | | | |
| I Emotional & verbal responsivity | | | | | 6 | 5 | 1 | 7 | 17 | 28 | 49 | 49** | 9.85 |
| II Avoidance of restriction & punishment | | 1 | 2 | 7 | 25 | 24 | 45 | 48 | 10** | | | | 5.99 |
| III Organization of temporal environment | | 1 | 2 | 14 | 33 | 61 | 51** | | | | | | 5.01 |
| IV Appropriateness of play materials | | 1 | 1 | 2 | 10 | 20 | 31 | 28 | 46 | 23** | | | 7.07 |
| V Maternal involvement with child | 1 | | 11 | 17 | 33 | 33 | 67** | | | | | | 5.08 |
| VI Opportunities for variety in daily stimulation | 1 | 22 | 42 | 53 | 32 | 12** | | | | | | | 2.80 |
| 12 Month N = 169 | | | | | | | | | | | | | |
| I Emotional & verbal responsivity | | | | | 1 | 4 | 3 | 12 | 10 | 22 | 48 | 69** | 10.18 |
| II Avoidance of restriction & punishment | 2 | 5 | 6 | 10 | 20 | 30 | 46 | 41 | 9** | | | | 5.75 |
| III Organization of temporal environment | | 1 | 3 | 13 | 37 | 69 | 46** | | | | | | 4.94 |
| IV Appropriateness of play materials | | 2 | | 2 | 3 | 4 | 10 | 25 | 45 | 78** | | | 8.36 |
| V Maternal involvement with child | | 2 | 9 | 10 | 29 | 35 | 84** | | | | | | 5.49 |
| VI Opportunities for variety in daily stimulation | | 12 | 29 | 41 | 48 | 39** | | | | | | | 3.55 |

**Highest score possible for this subscale.

## DISTRIBUTION OF SUBJECTS BY TOTAL SCORE ON HOME STIMULATION INVENTORY AT 4, 8, & 12 MONTHS OF AGE

| Age | Number of Scores | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 13-20 | 21-25 | 26-30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42-45 |
| 4 Months N=178 Median 33.85 | 6 | 9 | 36 | 9 | 15 | 12 | 13 | 22 | 17 | 14 | 11 | 6 | 2 | 4 | 2 |
| 8 Months N = 162 Median 35.08 | 4 | 9 | 16 | 8 | 11 | 12 | 10 | 19 | 14 | 10 | 12 | 12 | 10 | 8 | 7 |
| 12 Months N = 169 Median 37.54 | 5 | 4 | 13 | 5 | 8 | 9 | 7 | 8 | 10 | 15 | 11 | 18 | 17 | 15 | 24 ~~22~~ |

# CHAPTER 5

# INSTRUMENTATION AND FINDINGS: PARENTAL PERCEPTIONS

## OVERVIEW

The assessment of parental perceptions is important for two reasons. First, the literature on interpersonal perception suggests that parents' perceptions of the child influence behavior in various ways, thereby indirectly influencing the child. Most specifically, the parents' perception of the child may have a major impact on the child's self-image concept, since the parents' comments and behaviors to the child are one of his most important ways, in the early years, of assessing the impact he has on the world around him. In particular, there is reason to expect that a particularly stressful situation would exist between parent and child if the child's behavior did not match the parents' perception of what an "ideal child" ought to be like. Thus for predictive purposes, it is of interest to know something about a parent's view of the ideal child, his perception of his own child, and any discrepancies between them.

A second reason for interest in parental perceptions of the child stems from a need to find channels of accurate information about children's development without extensive testing of the child. If parental perceptions of their children are generally accurate, and if they can convey those perceptions with reasonable precision, then it should be possible to use parents as informants about their children so as to give preventive care.

Unfortunately, studies of the accuracy of parental perceptions of their children have been done most often with parents of retarded children;

such information is useful in telling us something about parental accuracy in cases of severe impairment, but may not generalize well to parents with normal children. In such studies parents are asked to estimate their child's developmental age in comparison to children of the same age. Accuracy of parental report is then determined by comparing the parents' ratings or judgments about their child with the ratings or judgments obtained from experts, or the scores from standardized tests. Findings from these studies vary in the degree of parental accuracy; one reports a correlation of .78 between parental and pediatrician estimates, while another shows a correlation of only .50.

Studies show that when parents are incorrect in their perceptions, it is almost always in an upward direction; they see their child as better than he is. In general, mothers are more likely to overestimate than are fathers. The degree of overestimation is related to the degree of the child's retardation: more severely retarded children are more accurately perceived. It is the children closest to normal who are most often overestimated, which again calls into question the generalizability of results from studies of retarded children to families of normal children.

Although parents may tend to underestimate the degree of the problem and to overestimate the child's abilities, one might conclude from the evidence that when parents do recognize a problem, their opinion should be heeded. This is probably especially true for the early everyday signs of trouble which parents are in the best position to observe.

But what are the implications for the child of variations in the parents' perceptions? What if the parents are inaccurate? Does this error have an impact on the child?

The evidence about effects of parental perceptions on the child is scanty yet provocative. Only two studies, both very recent, provide helpful information. Greenberg (1971) studied two groups of mothers and children, one in which the child had minor physical abnormalities at birth, and the other in which the child was normal at birth, but had serious developmental problems at age 1. When mothers' perceptions of their infants were assessed, Greenberg found that the mothers of the originally healthy infants had strikingly inappropriate perceptions; either they were unaware of any problem in their 1-year-old, or saw a problem but greatly underestimated it. These same mothers, in general, had unplanned symptomatic pregnancies, less education, and had been among the younger siblings in their own families.

Greenberg's findings are curious, in that they suggest a poor outcome for an infant whose mother either does not notice, or "denies" the existence of serious problems. Are the child's problems a result of neglect on the part of the mother? Or are the child's problems and the mother's greatly inaccurate perceptions both reflections of a dysfunctioning mother-child dyadic relationship?

Broussard and Hartner's study (1971) is more informative. They used a technique in which the mother is asked about various characteristics of the "average baby," and then asked about her own baby. For example, they ask "How much crying do you think the average baby does?" and then give five alternatives: a great deal, a good bit, moderate amount, very little, none. After a series of questions about the average baby, the same questions are asked about her own child. Out of this comes a score which indicates whether the mother, in general, thinks her baby is above or below the average baby. In their study 318 primiparae were asked to rate the "average baby" and their own baby, at two separate time points, first during the first and second postpartum day (while still in the hospital), and second at approximately 1 month. All the infants were initially healthy-appearing. At 1 month, in addition to the ratings of the infant, the mother was also given Schaefer's postnatal research inventory, which yields a set of scale scores, six of which were used: depression, negative aspects of child rearing, irritability, need for reassurance, fear or concern for the baby, and mother's psychosomatic symptom anxiety.

At the time one assessment (right after birth), 46.5% of the mothers rated their infants as better than average, although these ratings did not correlate with Schaefer's scale scores. At time two (1 month), 61.2% of the mothers rated their infants as better than average, and the perceptions of the infant were correlated with Schaefer's scale scores. Those mothers who rated their infants as below average were significantly more likely to rate high in depression, irritability, and negative aspects of child rearing.

Broussard and Hartner considered that the combination of a low rating of the infant with maternal depression and irritability might well bode ill for the child's later emotional development. The 1-month findings suggested that some of the mothers and infants had already established poor dyadic interactions; prolongation of such a relationship might well produce emotional disturbance in the child at a later point.

To test this possibility, Broussard and Hartner divided their original sample into "high risk" and "low risk" infants, on the basis of the mother's evaluation of the baby at 1 month; those who had been rated by their mothers as above average at 1 month were considered at low risk for later psychiatric disorders, while those who had been rated by their mothers as below average at 1 month were considered at high risk for later psychiatric disorder. Eighty-five of the children were then followed until they were approximately 4½ years old, at which time an independent assessment of their psychiatric status was made. The clinical judgments were made by people who did not know whether the children had been rated as high or low risk initially. Each child was rated by the clinician as needing, or not needing therapeutic intervention at age 4½. The results are suggestive: the mother's perceptions of the child at time one (at birth) did *not* predict the later need for therapeutic intervention, but her perceptions of the child at time two (1 month) did. Sixty-six percent of those in the "high risk" group were seen at age 4½ as needing therapy, while only 20 percent of the low risk group were seen as requiring help at age 4½. In addition, the scores on Schaefer's postnatal research inventory taken at 1 month, also predicted the need for intervention at age 4½: those mothers who, one month after the birth of the child, were depressed, showed psychosomatic anxiety symptoms and many "negative aspects of child rearing" were more likely to have a child who at 4½ was perceived as needing psychiatric attention.

It is interesting to note that the need for intervention at age 4½ was not related to the mother's education, the father's occupation, changes of income, prenatal or postpartum complications, type of delivery, age of mother at delivery, or sex of child.

In a follow-up of this cohort of children Broussard (in an unpublished manuscript) found the relationship between maternal perception of the neonate and emotional developmental deviation still held at 10 years of age; only 7.7 percent of those children perceived negatively at both timepoints (2 days and 1 month of age) were considered free of emotional disorder upon psychiatric evaluation. Again the predictability of the maternal perception ratings was independent of educational level of the father or mother, father's occupation, changes in income, type of delivery, mother's age, religious preference, and number of siblings.

It should be noted that there are two possible interpretations from Broussard's and Hartner's results. First, mothers at one month may have correctly perceived the degree of difficulty their infants were having; the low rated infants may really have had more problems, not because of anything the mother did, but because of some inherent difficulty. Alternatively, the mother's perceptions at one month may have operated as self-fulfilling prophecies. Those mothers who see their infant as better than average may continue to treat the child as though he were better; since they have a generally optimistic view of the child and the child's future, they may develop a positive interaction with the child which in turn leads to good mental health. Those mothers who see their child as below average may continue to see the child as subnormal, to treat the child as such, and to have (or to develop) a pessimistic attitude toward the child or toward their ability to cope. Without an independent assessment of the children, it is difficult to select between these alternatives, although the fact that the mother's emotional state at one month postpartum was related to her perception of the infant lends some weight to the second alternative.

The results from the Greenberg and Broussard and Hartner studies are intriguing, even though they raise more questions than they answer. The suggestion is there, however, that the parents' perceptions of the child may act as causal agents in the child's later development, particularly in the child's emotional development.

There are many other elements in the ways parents view their world with ramifications for the environment of the developing child. For example, is the social support system within the home perceived as positive? What are the attitudes and expectations of the parents which mediate their relationships toward one another and toward the child? In seeking answers to these and similar questions, parents represent the best source of information.

Whatever the subject of parental perception, whether of the child, his progress, his parents' satisfaction in their roles, or the home milieu, there is a sense in which congruence with the clinical verdict is less important than the coloration of what the parent perceives. If the parent perceives something as a problem or as uncomfortable, there is, in one way or another, a problem. Because parents play such a critical role in the care and development of the very young child, they must be the focus for supportive or instructional intervention. We believe that in order to help the child we must listen to parents, both in their interest and in the interest of the child.

Several areas of parental perception and reporting are presented in this chapter. They represent those which the developmental phase of the project indicated were most important for predictive child assessment based on past and current research. For reference, Appendix 5.1 contains all the variables reported in this chapter.

## INSTRUMENTATION AND FINDINGS

For some of the desired areas of parental perception, other investigators had already constructed feasible ways of obtaining the necessary information, i.e., the Carey Temperament Questionnaire, the Neonatal Perception Inventory and the Developmental Profile. For others we had to devise our own ways. We will begin by discussing the portions of the maternal interviews we developed and then consider the instruments of others which we incorporated into the interviews.

Information about child health and development has traditionally relied heavily upon contact with the mother. This study is no exception. There are at least two good reasons why our design has focused on maternal perceptions and reporting during infancy. During this period of the child's life the mother is usually more intimately involved in caretaking than is the father. There is also the practical consideration of the unavailability of fathers for repeated study contacts. None of this, however, is meant to minimize or underestimate the role of the father in the development and well-being of the child. During the maternal contacts we tried to get the best possible picture of the father's activities and attitudes by the mother's report. At the end of the year we obtained this type of information directly from the fathers.

## Mother Interviews

Many of the factors indicated by the literature as being important to child health and development a) are not part of traditional health care assessment, b) do not have currently available methods by which to assess them, c) not being overtly observable, depend on parental reporting, or d) may well be assessed more efficiently in a screening process by using parental reports. For these reasons interview items were devised to obtain information from mothers on those factors expected to be useful in predicting future health and developmental problems of their children and in getting clues for how to help them. These interviews were also used as the source of information on demographic variables.

A listing follows which highlights the major areas of content for each of the maternal perception instruments:

### Prenatal Questionnaire (Appendix 5.2)

Note: This is the only contact in which a questionnaire was used rather than an interview.

| | |
|---|---|
| Attitudes and concerns | Feelings about being pregnant and concerns during pregnancy |
| Expectations about baby | e.g., what baby would be like, when she expects to see, hear, and be aware of surroundings |
| Preferences about baby | Whether wants cuddly or active baby, boy or girl |
| Disruption caused by pregnancy | Whether pregnancy planned, interruption of future plans |
| Help and support | Amount of physical and emotional help during pregnancy, someone to share concerns with |
| Husband's or partner's attitudes and concerns | Feelings about pregnancy and major concerns |

### Newborn Interview (Appendix 5.3)

| | |
|---|---|
| Pregnancy history | Past pregnancies, medical complications, medications, etc. |
| Family health history | Conditions of mother and other relatives |
| Prenatal care | Visits to doctor and prenatal classes |
| Labor and delivery experience | Reaction to the birth process |
| Help at home | Whether will have help after discharge and if arrangement satisfactory |
| Concerns | Mother's and father's primary concerns at this time |

### One Month Interview (Appendix 5.4)

| | |
|---|---|
| Reaction to child | What it's been like since baby brought home; reaction to crying, etc. |
| Caretaking activities | Involvement of each parent |
| Decision making | Participation of each parent in several types of decisions |
| Mother-father relationship | Their similarities and differences, agreement on child rearing, and mother's satisfaction with the relationship |
| Concerns | Primary concerns of each parent |
| Perception of motherhood | Feelings about being a mother |

### Four and Eight Month Interviews (Appendix 5.5)

Note: These two interviews were identical.

| | |
|---|---|
| Family's health | Illnesses and accidents of child, health of other family members |
| Caretaking activities | Involvement of each parent |
| Perception of motherhood | Feelings about being a mother |
| Concerns | Primary concerns of mother |

### Twelve Month Interview (Appendix 5.6)

| | |
|---|---|
| Mother's time out of home | Mother return to school or employment, alternate caretakers |
| Child's health | Illnesses and accidents |
| Discipline | Frequency and types of discipline, parent agreement on discipline |
| Caretaking activities | Each parent's involvement, mother's management of time |
| Concerns | Primary concerns of each parent |

| | |
|---|---|
| Future plans | Mother's future plans for child, her perception of how well child will do at school |
| Perception of motherhood | Feelings about being a mother, amount of help during year, and plans for other children |
| Reaction to study | How influenced their activities with child; advice and suggestions they have |

The frequency distributions from these interviews (Appendix 5.7) provide a picture from the mothers' points of view at the different times from pregnancy through the first year of their children's lives. Although only 54 percent said their pregnancy was planned and not a surprise, 78 percent of the mothers were pleased or delighted at learning they were pregnant. More (87 percent) reported feeling positively by the third trimester. Approximately the same proportion of fathers were reported by the mothers to be pleased or delighted about the pregnancy.

These expectant mothers were not without their problems, however. Thirty-eight percent viewed pregnancy as a moderate to great interruption of their plans for schooling or a career. Some lacked the amount of physical help (8.3 percent) or emotional help (15.1 percent) they felt they needed. Many expressed concerns during the prenatal period, primarily about their unborn child's health and their own health.

A majority of the mothers preferred a baby that would be both cuddly and active. The majority also had no sex preference. For those who stated a preference, however, slightly more mothers preferred a boy than a girl. Fathers reportedly had stronger hopes for boy babies.

When asked what they expected their babies to be like, approximately one in five mothers offered no response or said they didn't know. Some of the most interesting insights into maternal expectations, however, came from asking questions about the very early stages of child development, e.g., at what age the baby would be aware of the surroundings, would hear, and would see. Table 5.1 shows the mean ages of the responses. Although some mothers realized that their babies would be sensitive to sensory stimuli as early as birth, many clearly did not anticipate the potential their newborns would have for reacting to the outside world of which they (the mothers) would be an important part. For example, on the average, mothers thought their baby would be aware of his surroundings and what was going on around him at 2 months of age. Only 13 percent expected awareness to start at birth and 36 percent reported it would occur after 2 months of age. The expectation, in fact, ranged up to 1 year of age. The data in Table 5.1, especially the upper end of the ranges reported by the mothers, certainly has implications for prenatal education. It also suggests the potential benefit of using techniques such as the Brazelton Neonatal Assessment to demonstrate to the parents during the newborn period babies' capacity for alertness and response.

After the important event of the baby's arrival, while the mother was still in the hospital, information was obtained from her about her reactions to the birth process. First, an open-ended question was asked to get their most spontaneous responses: "What did you think of your labor and delivery experience--what was it like?" Multiple responses were accepted and coded into the categories shown in Table 5.2. When mothers were unlimited in the number of comments they could make, 50 percent used negative terms in describing their labor and delivery experience. The mothers were next asked to rate the same experience on a five-point scale. It is interesting that when forced to make one qualitative summary of it, the negative nature

## TABLE 5.1

## MOTHERS' EXPECTATIONS ABOUT THEIR BABIES' AGE FOR SPECIFIED ACTIVITIES

| Question | Mean in weeks | SD in weeks | Range |
|---|---|---|---|
| At what age do you think your baby will start to be aware of his/her surroundings or know what is going on around him/her? | 7.8 | 8.1 | Birth to 1 year |
| At what age do you think you will start teaching things to your baby? | 9.5 | 10.5 | Birth to 1 year |
| At what age do you think your baby will first be able to see objects and people clearly? | 6.9 | 5.2 | Birth to 8 months |
| At what age do you think your baby will first be able to hear sounds and voices clearly? | 4.0 | 4.7 | Birth to 8 months |
| At what age do you think talking to your baby will be especially important? | 11.4 | 19.2 | Birth to 2 years |

## TABLE 5.2

## PERCENT OF MOTHERS REPORTING SPECIFIED RESPONSES TO LABOR AND DELIVERY

| Response Category | % |
|---|---|
| Terrible, painful, awful, bad, ordeal, gruelling | 50.3 |
| Hardwork, exhausting, intense, long | 16.1 |
| Beautiful, exciting, good, nice, fun, easy, quick | 50.3 |
| Neutral, just as expected, not bad | 10.4 |
| Preparation, classes, practices, natural childbirth | 19.2 |
| Drugs, pain killers, anesthesia, induction | 26.4 |
| Help from husband, doctors, nurses | 29.0 |
| Other | 20.2 |

## TABLE 5.3

## DISTRIBUTION OF MOTHERS BY RATING OF LABOR AND DELIVERY

| Rating | % |
|---|---|
| Best experience ever had | 14.1 |
| Exciting and fascinating | 57.3 |
| Neither pleasant nor unpleasant | 10.4 |
| Unpleasant or depressing | 12.0 |
| Worst experience ever had | 5.2 |
| None of above; specify | 1.0 |

of the previous responses diminishes (Table 5.3). Nearly three-fourths rated their labor and delivery as exciting and fascinating, or as the best experience they had ever had. This discrepancy may be a good example of differences in information gained through informal, open-ended questions and more structured, forced-choice types. These differences will need to be recognized in the ongoing development of assessment methods.

In any event, there are potential indicators of the need for help and support when some mothers view their infant's arrival as an unpleasant event or worse. This was the case for 33 of the study mothers (Table 5.3). As one might expect, experiencing perinatal complications (as indicated by the risk score) was associated with a negative perception of the labor and delivery experience (tau = .20, $p < .01$).

The mothers were asked whether they would have someone to help them at home after being discharged from the hospital. The overwhelming answer was yes (93 percent). Two-thirds expected to receive help from their own mother and the rest from husbands, other relatives or friends. Almost without exception, they were satisfied with the helping arrangements.

While in the hospital, the mothers showed a shift in their primary concerns; although they still gave thought to the child's and parents' health, they were more concerned with the physical caretaking of their new baby.

When the babies reached 1 month of age the study home visits began. Although no data were collected to document these impressions, the home visitors summarized their views of the one-month contacts along the following lines: this appeared to be a time of reorganization for the families. Adjustments were still being made to the presence of a new family member, to the responsibilities for care and to disrupted schedules. Mothers, unlike the way they appeared in later visits, were often dressed in robes. Fatigue and depression were suggested in some households by the mothers' low energy levels, the drawn curtains, and the darkened homes.

Even so, when the mothers were asked at one month what their babies had been like since their homecoming, about three out of four made positive comments about their child's temperament. The next most frequent comments (30 percent) were negative in nature and involved the schedule of infant activities such as sleeping and feeding. This is congruent with the findings from the Sleep-Activity Record (Chapter 3), which documented the first month as being the most irregular.

At this early age, one of the baby's major signals for attention of one kind or another is crying. About one-fourth of the mothers reported that their babies' crying disturbed them. Another fourth said it didn't bother them. The rest reported a variety of reactions such as empathy, helplessness, or awareness of the need to adjust to it. When asked what they did about their infant's crying, one-half said it depended on the type of cry. That is, they could distinguish differences; knowing the approximate schedule, they decided what approach to take, e.g., whether to feed, change, turn, comfort, or let cry. Some mothers said they responded immediately to crying; others said they usually waited 20 minutes before responding. The mean was four minutes.

The mother was the major caretaker for all but five of the babies. Most reported that the father assisted a moderate to a great deal in child care, but about one out of four mothers said he helped very little or not at all. The activities in which the father participated most were "playing" (90 percent), "diapering" (79 percent), and "feeding" (58 percent).

Besides the time spent in caretaking activities, the mothers reported considerable involvement with the child in other ways such as rocking, talking, holding, and so forth. Most said they were spending 30 minutes at a time, three to four times daily in non-caretaking activities with the child. All but 13 percent were able to identify something they were teaching their baby as early as 1 month, the predominant category of teaching being some kind of eye skill.

Mothers were concerned primarily about four major areas at one month: their children's health, family relationships, parenthood, and finances. Mothers reported fathers to have a clear majority in financial and job-related concerns. To view these findings as they were based in the realities parents faced, this was the time of economic hardship and high unemployment which hit the Seattle area with especial force.

Most (85 percent) of the mothers saw themselves as making the routine (such as scheduling or how to feed or bathe) decisions about the baby. When it came to the important decisions (e.g., when to call the doctor or the choice of a babysitter) about the baby, however, one-half of the couples made these jointly. The degree of parent agreement or mutuality in regard to the children as reported in this sample is high; 81 percent reported that the mother and father agreed a good bit or a great deal on how to raise their child.

The conduciveness of the environment for child rearing in this group is further shown by the positive comments made about motherhood; very few reported neutral, ambivalent, or negative feelings about being a mother. Of course, motherhood is something we might expect very few to speak against no matter how they felt. The variability on this item provides little helpful information except in combination with other related variables.

At four months it was evident that our study families were more settled and adjusted to their infants. Mothers were even more positive in describing their babies. Their comments about their recent experience as a mother indicated that they were mindful of the adjustment they were going through and that things were improving. When asked whether motherhood matched their expectations, 36 percent said it did not. Most said being a parent was better than they expected, but 10 percent thought it was worse or more demanding than they had anticipated.

At four months a picture of the parents' health was obtained, and problems were reported which undoubtedly made the parent roles more difficult. The major problems reported by mothers were viruses or allergies (22 percent), sleep disturbances (14 percent), and genito-urinary conditions (10 percent). Three percent of the mothers also reported emotional problems. Two-thirds of the mothers were under routine medical care for checkups and an additional 20 percent were under care for health problems. In contrast, 43 percent of the fathers were under care, mostly for regular checkups (30 percent).

Most of the mothers (98 percent) rated their child's health as good to very good, and practically all of the children were under a doctor's care for well-child supervision.

The parental concerns expressed at four months were similar to those reported earlier, i.e., their child's health, the responsibilities of parenthood, and the financial and practical requirements of making ends meet. Fewer mothers, however, spoke of child-related concerns. This is not surprising, since the first month is an intense time for the mother in getting acquainted with the baby and establishing successful care routines. By the fourth month many mothers were working or had other involvements.

They also had had a chance to get to know their babies.

With the growth of the children parent activities showed change. Fathers were reportedly expanding their child care activities more in the areas of bathing, soothing, and other comforting activities. More mothers said they talked to and played with their 4-month-old babies. Only four mothers said they engaged in no child teaching activities. The rest were doing more teaching in the areas of grasping, language, and motor development.

The mother continued to be the primary caregiver in most of the families. The majority (76 percent) of the fathers, however, were involved in the child's care to a moderate degree or greater. Most of the mothers (81 percent) were satisfied with the father's caretaking involvement.

By 8 months of age children make important and evident developmental strides. Motorically they are about to the point of crawling; in language some have begun imitative repetitive syllables; socially their responses include belly laughs. They are active and responsive in a manner which makes those around them more aware of them as persons rather than just as dependent babies. Our mothers tended to describe their infants at 8 months in terms of their physical development and, for the first time, to stress evidence of their individuality.

Parents were responding and adapting to these developmental changes with changes in their own activities. Many mothers reported they and the fathers were teaching their children different motor skills, and more reported teaching activities related to language and social development than had previously. As a group fathers maintained their involvement in child care (78 percent were giving a moderate amount of care or more), and some mothers (15 percent) again expressed dissatisfaction with their partners' involvement.

As for their motherhood experience, the majority again expressed positive feelings. Some, however, said they were still adjusting or felt things were improving. Although those expressing negative feelings about motherhood were in the minority, it was a larger minority than at four months.

Although approximately one-third had health complaints of viruses or allergies, the other problems such as sleep disturbances were much less prevalent. Thirty percent of the mothers were under a doctor's care for reasons other than regular checkups.

By the study children's 12th month, 45 percent of the mothers had returned to work or school. Their infants were cared for in the mother's absence mostly by relatives, friends or sitters and almost without exception these arrangements were considered satisfactory.

At 1 year of age mothers' descriptions of their babies focused even more on their physical characteristics; both parents did the most teaching in motor and language development. When the mothers were asked what they enjoyed most about their child the most frequent responses were: watching the child, playing with him, taking pride as a parent, and being pleased about his health and happiness. They said the hardest part about their 12-month-olds was: the caretaking, guiding character development, and having patience.

The median frequency for child discipline was three to five times per day and the primary forms it took were saying "no-no" or hand-slapping. Disturbing the parents was given as the major cause of discipline. Mothers reported the main areas of disagreement with the father regarding child rearing were restrictions on the child and punishment procedures. But three-fourths of the mothers reported high agreement with the father on child-rearing practices.

At 12 months more positive comments were made about the mother's role, and 68 percent of the couples were already planning for subsequent children. Although the majority of parents' primary concerns at that time were not related to the 1-year-old, when mothers were asked specifically about developmental concerns, one out of four said they did have some. These concerns included all areas of development, but there were more concerns about physical development.

Data Reduction. Appendix 5.1 shows the variable sets from the interviews with mothers, the source from which the sets were derived, as well as the median, range, and N. We followed several steps in arriving at these sets. First, all open-ended questions were coded into meaningful categories. Then frequency distributions were run on all variables; those which showed no variability were excluded from further analysis. Items with similar meaning were combined into potential sets so as best to reflect the underlying meaning. Correlations or cross tabulations were then done to assure that there was covariance among the variables within each set, or that at least they were not working against each other. Those variables retained in the sets were then summarized, usually through addition, to get a score for each set. The formula used to score the summed variables was:

(# of positive responses/ # of responses given) x total possible responses for the set

This adjusted the score in the event that some items in a set were not answered. Responses to more than one-third of the items in any set had to be present for the individual to receive a score on the set.[1]

The reader will note in Appendix 5.1 that the variable sets vary as to the time points for which they exist; some sets are available for all study ages and some for only one or two. It will also be noted that, for those sets available across time points, the items forming the set sometimes differ from one time to another. These differences result from the natural changes in content pertinent to child rearing at different times during infancy and from the practical limitations on getting all possible information at each contact.

A brief description of each variable set[2] and, where appropriate, its consistency over time follows:

PSYCHO-SOCIAL ASSETS (PSA): This variable set includes supports and positive characteristics in the mother's life that we considered conducive to an optimal environment for mothering and child rearing.

Prenatally--a mother was considered to have a high index of psychosocial assets if the pregnancy had been planned, if she was pleased about pregnancy, and did not find the pregnancy to be disruptive of her future plans. She also had someone with whom to share her concerns and had enough physical and emotional help as well as some free time for herself during the pregnancy.

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[1] There were two exceptions to this scoring procedure: 12-month Achievement Expectations was scored by multiplying the items in the set; prenatal developmental expectations was obtained through averaging the items--three out of the five had to be answered to be scored.

[2] The frequency distributions for the reduced variable sets are at the end of Appendix 5.7.

One Month--a mother with a high PSA index was satisfied with her marriage and had positive feelings about being a mother.

Four and eight months--a mother with a high PSA index was satisfied with the father's caretaking involvement, had had positive mothering experiences and felt positive about motherhood.

Twelve months--a mother with a high PSA index had had positive mothering experiences and enough physical and emotional help throughout the year.

The Kendall Taus between the PSA scores across time points ranged from .00 to .24. The highest significant correlation was between 4 and 8 months (the items for both of these time points were identical). The most consistency is shown between 1 month and all later ages, but the coefficients are generally low, indicating only moderate stability over time.

DEVELOPMENTAL EXPECTATIONS: (Prenatally only) This variable set taps the mother's knowledge level about some of the beginning stages of a child's development, such as seeing, hearing, etc. The score is an average in weeks of the five items. The most desirable direction of this value is toward lower values, i.e., the earlier a mother expects her baby to see, hear, and be aware of surroundings, the earlier she is apt to provide animate and inanimate environmental stimulation for the child.

FATHER INVOLVEMENT: This set reflects the mother's perception of the father's participation in the child's care, his teaching activities with the child and any concerns he had about the child.

Prenatally--the highly involved father is pleased about the pregnancy and is the person who gave his wife the most physical and emotional support during the prenatal period.

One month--the highly involved father is a moderate to great participator in the child's care, providing four or more caretaking activities, and has some child-related concerns.

Four and eight months--the highly involved father possesses all of the qualities described at the 1 month plus he teaches the child one or more things and spends two or more hours with the child each day.

Twelve months--the highly involved father is one who teaches the child one or more things, has some child-related concerns, and is the person the mother has perceived as giving her the most physical and emotional help during the previous 12 months.

There were significant correlations between all time points. There is some indication that fathers who become involved with their child as early as before birth remain involved. The size of the correlations, however, does not indicate good prediction from early scores (Table 5.4).

MOTHER INVOLVEMENT: This variable set is composed of those items related to the actual time the mother spent with the child, and her expressed concerns about the child. Since we did not have the advantage of lengthy home observations, this set was an attempt to determine something of what goes on with a mother and child during non-caretaking times.

One month--the highly involved mother is one who spends three or more hours/day with her child in non-caretaking activities. She teaches the child one or more things and has some concerns about the child.

Four and eight months--the highly involved mother is one who spends four or more hours/day in non-caretaking activities with her child, is teaching or helping the child to learn one or more things and expresses some concerns about her child.

Twelve months--the highly involved mother spends two or more hours with her child each day in non-caretaking activities, has some child-related concerns and manages her time around the child, i.e., she organizes her work so as to correspond with the child's schedule or in some way involves the child in her work. She also teaches the child one or more things.

There were no significant correlations among any of the time points. The mothers apparently were variable or inconsistent in the amount of their non-caretaking involvement with the child.

PARENT MUTUALITY: This set is composed of data collected at 1 month and 12 months. These data reflect the mother's perception of the degree of agreement between her and her husband.

One month--a highly mutual couple make their decisions jointly and are in agreement regarding child rearing.

Twelve months--a mutual couple is in agreement on how to discipline and raise their child.

A couple's degree of mutuality and agreement was considered important because these qualities may facilitate child rearing and prevent interpersonal friction.

There was a small but significant correlation (.16) between the two time points, 1 and 12 months.

ACHIEVEMENT EXPECTATIONS: This set is a combination of the mother's perception of the child's success in school and the level of schooling the mother perceived the child would achieve. High expectations of the child at 12 months indicate that the mother expected the child would be above average in school and excel beyond a college level of education.

MOTHER'S CONCERNS ABOUT HER CHILD: Because of our commitment to find better ways of listening and learning from parents, the study mothers had many opportunities to share information with us about their children. One important aspect was listening to the concerns the mother expressed. Mothers were

## TABLE 5.4

### CONSISTENCY OVER TIME OF FATHER INVOLVEMENT FROM INTERVIEWS AT PRENATAL, 1, 4, 8, 12 MONTHS

| Variable | | 1 mo. | 4 mo. | 8 mo. | 12 mo. |
|---|---|---|---|---|---|
| Father Involvement | Prenatal | .22* | .20* | .10* | .20* |
| | 1 mo. | | .20* | .18* | .23* |
| | 4 mo. | | | .26* | .22* |
| | 8 mo. | | | | .22* |

*Kendall Correlation Coefficients; $p < .05$; Range of N = 158-184

## TABLE 5.5

### CONSISTENCY OVER TIME OF MOTHER'S CONCERNS ABOUT INFANT FROM INTERVIEWS AT 1, 4, 8, 12 MONTHS

| Variable | | 4 mo. | 8 mo. | 12 mo. |
|---|---|---|---|---|
| Mother's Concerns about Infant | 1 mo. | .20* | .12* | .16* |
| | 4 mo. | | .22* | .13* |
| | 8 mo. | | | .27* |

*Kendall Correlation Coefficients; $p < .05$; Range of N = 164-179 asked at each visit to share not only their primary concerns about anything, (included in the Mother Involvement variable set), but any specific concerns they had about the child's feeding and sleeping. In addition, at the 12-month visit the mothers were asked about any concerns they had about the child's growth and development, or any concerns about the child's temperament characteristics. The concern score consists of the number of concerns mentioned.

There were low but significant correlations (Table 5.5) between all time points. When mothers had concerns at early visits they were not necessarily solved or worked out at the time of later ones. This indicates we should not assume that concerns will take care of themselves. Intervention at the time the mother expressed concerns would appear warranted, and a screening model should include an assessment of the mother's concerns at each time point.

Table 5.6 shows the correlations between the maternal perception variable sets and the mother's years of schooling. The coefficients are generally low--lower than one would intuitively anticipate. There is little association between the mother's education and such variables as labor and delivery experience, neonatal perception, and the mother's involvement over the year. The trend shown by other variables, however, is in the direction anticipated. For example, during the prenatal period more highly educated mothers report more psycho-social assets, more father involvement, and earlier developmental expectations for their babies. Relationships between maternal schooling and reports about the father are also evident: more highly educated mothers report higher parent mutuality as well as more father involvement.

## TABLE 5.6

## PARENT PERCEPTION VARIABLE SETS RELATED TO MOTHER'S YEARS OF SCHOOLING*

| Variable Sets | Prenatal | Newborn | 1 Month | 4 Months | 8 Months | 12 Months |
|---|---|---|---|---|---|---|
| Psychosocial Assets | .12* | --- | .03 | .02 | .11* | .05 |
| Father Involvement | .12* | --- | .10* | .08 | .21* | .18* |
| Developmental Expectations (low=early) | -.11* | --- | --- | --- | --- | --- |
| Labor & Delivery Experience (low=pleasant) | --- | -.07 | --- | --- | --- | --- |
| Neonatal Perception | --- | -.08 | .02 | --- | --- | --- |
| Mother Involvement | --- | --- | .01 | -.08 | -.05 | -.02 |
| Parent Mutuality | --- | --- | .24* | --- | --- | .14* |
| Child's Overall Temperament Rating (low=easy) | --- | --- | -.08 | .01 | -.18* | -.07 |
| Mother's Temperament (low=easy) | --- | --- | -.07 | --- | --- | --- |
| Mother's Concerns | --- | --- | .06 | .17* | .10* | .22* |
| Achievement Expectations | --- | --- | --- | --- | --- | .23* |
| Developmental Profile: | | | | | | |
| Physical Age | --- | --- | --- | --- | -.08 | -.09* |
| Self Help Age | --- | --- | --- | --- | -.03 | .01 |
| Social Age | --- | --- | --- | --- | -.16* | -.06 |
| Academic Age | --- | --- | --- | --- | .05 | .03 |
| Communication Age | --- | --- | --- | --- | -.09* | -.00 |
| Child's Temperament - Specific Characterictics: | | | | | | |
| Physical Activity | --- | --- | .10* | .08 | .04 | .04 |
| Rhythmicity | --- | --- | -.11* | .12* | .01 | -.04 |
| Approach | --- | --- | -.01 | -.12* | .04 | -.05 |
| Adaptability | --- | --- | -.11* | .03 | .05 | -.00 |
| Intensity | --- | --- | -.02 | -.03 | .13* | .04 |
| Distractibility | --- | --- | -.08 | .12* | .03 | .11* |
| Sensitivity | --- | --- | -.15* | -.04 | -.10* | -.03 |
| Mood | --- | --- | .06 | .06 | -.13* | .00 |
| Persistence | --- | --- | .02 | -.07 | -.07 | .01 |

*Kendall correlations coefficient; $p < .05$; Range of N = 129 - 180

There are some differences in perception of the child by maternal education. Logically those with more schooling hold higher achievement expectations for their children. It is not clear why the more educated mothers have more concerns about the child unless education is related to a greater sensitivity to potential problems or to a greater likelihood of voicing concerns.

Correlations between the ordinal perinatal risk score and the maternal perception variable sets are shown in Table 5.7. The mothers of high risk pairs report fewer prenatal psycho-social assets, have later developmental expectations of their babies, and more negative perceptions of their 1-month-olds. They also tend to report less father involvement and more unpleasant labor and delivery experiences. These relationships might intuitively be considered secondary to associations with education, except that the ordinal risk scale is not related to maternal education. It does seem logical that more maternal time and involvement might be required for babies at higher risk, but the small significant correlation is found only at 12 months.

Even though one might expect differences in maternal perceptions based on sex of the baby, virtually none were found.

We did not believe that the perceptual variable sets from the maternal interviews would be independent; we anticipated that positive values on variables such as psycho-social assets, father involvement, and parent mutuality would cluster together within families. Appendix 5.8 shows the intercorrelations among the perceptual variable sets at each time point. There is some evidence of the expected interrelationships, especially early in infancy, but by 1 year they have practically disappeared. These findings indicate that there is little redundancy in these variables from the

## TABLE 5.7

## PARENT PERCEPTION VARIABLE SETS RELATED TO PERINATAL RISK*

| Variable Sets | Prenatal | Newborn | 1 Month | 4 Months | 8 Months | 12 Months |
|---|---|---|---|---|---|---|
| Psychosocial Assets | -.13* | --- | -.05 | -.01 | .01 | .00 |
| Father Involvement | -.06 | --- | -.04 | -.02 | -.14* | -.12* |
| Developmental Expectations (high=late) | .19* | --- | --- | --- | --- | --- |
| Labor & Delivery Experience (high=unpleasant) | --- | .20* | --- | --- | --- | --- |
| Neonatal Perception | --- | -.03 | -.11* | --- | --- | --- |
| Mother Involvement | --- | --- | -.02 | .00 | -.03 | .14* |
| Parent Mutuality | --- | --- | -.04 | --- | --- | -.07 |
| Child's Overall Temperament Rating | --- | --- | .07 | -.10* | -.02 | -.08 |
| Mother's Temperament | --- | --- | .06 | --- | --- | --- |
| Mother's Concerns | --- | --- | .03 | -.07 | -.07 | .04 |
| Achievement Expectations | --- | --- | --- | --- | --- | .02 |
| Physical Development | --- | --- | --- | --- | .02 | -.00 |
| Self Help Development | --- | --- | --- | --- | -.16* | -.06 |
| Social Development | --- | --- | --- | --- | -.08 | .03 |
| Academic Development | --- | --- | --- | --- | -.12* | -.08 * |
| Communication Development | --- | --- | --- | --- | -.07 | -.09 |
| Child's Specific Temperament Characteristics: | | | | | | |
| Physical Activity (high=less active) | --- | --- | -.03 | .12* | .07 | .07 |
| Rhythmicity | --- | --- | .06 | .02 | -.04 | .04 |
| Approach Withdrawal | --- | --- | -.10* | -.03 | -.05 | -.07 |
| Adaptability | --- | --- | -.10 | -.11* | -.07 | .02 |
| Intensity | --- | --- | -.11* | .09 | .01 | .10* |
| Distractibility | --- | --- | -.06 | -.08 | .04 | -.06 |
| Sensitivity (high=not sensitive) | --- | --- | -.02 | -.01 | .15* | -.02 |
| Mood (high=discontented) | --- | --- | .12 * | -.00 | .08 | -.04 |
| Persistence (high=not persistent) | --- | --- | .03 | .16* | -.07 | -.10* |

*Kendall correlations coefficient; $p < .05$: Range of N = 131 - 193.

interviews as the sets are constructed. As for what they reflect about real relationships, it is important to remember the low variability of this sample and the restrictions it places on recognizing associations. As it turned out these are for the most part highly involved parents, pleased with and in agreement about child rearing, with above average social resources and assets. Different relationships would undoubtedly result in a more diverse group of parents.

## Evaluations of the Mother Interviews

After each session with the mothers the interviewers were asked to give their evaluation of the contact. The purpose was to gain information about anything which might have influenced the content or course of the interview such as the cooperativeness of the mother, anything unusual which happened, and whether the interviewer felt comfortable.

The frequency distributions for these evaluations of the five interviews are given in Appendix 5.9. Typical for our sample is the finding that mothers were cooperative almost without exception. The interviewers were comfortable during most of the interviews (78 - 90 percent); the most discomfort reported was at the one-month visit (19 percent). This was the first visit into the mother's home and the amount of reported discomfort decreased with each subsequent visit. The interviewers were the most comfortable (90 percent) during the newborn interview. This is not surprising since that interview took place in the hospital setting which was a familiar environment to most of the investigators.

The number of interviews which were interrupted by unusual events or distraction from other people increased over the course of the year. By 12 months only about two out of three interviews were uneventful and undistracted. Even so, at 12 months the interviewers thought the quality of 72 percent of the interviews was good, and in 70 percent the information given by the mother matched impressions gained from observation in the home. The best interview as rated by the home visitors was at 1 month: this contact had the least distraction, the highest cooperation, and the highest overall quality.

These evaluations and our experiences have several implications for the future use of the maternal interviews in child screening and assessment. The degree of cooperation and information sharing from these mothers is undoubtedly related to their willingness to participate in long-term research. According to our experience and that of many public health nurses who have made postpartum visits for many years, there is no reason to anticipate that access to the homes of young children and to pertinent information will be refused by many mothers, even in high-risk families.

Furthermore, our data indicate that the optimal contact for gaining interview information may well be during the first month following delivery. Even in the face of, or perhaps because of, fatigue, feeling blue, and making the many adjustments to a new baby, mothers were receptive to talking with our home interviewers. This is advantageous because it offers an early opportunity to obtain predictive assessments.

Our coding and analysis have shown some of our interview items to be ambiguous; these need to be revised. For example, mothers freely answered the questions about their primary concerns. The correlation between their answers and other variables are sometimes illogical, suggesting that more distinction must be made between healthy and worrisome concerns about children and the parental role.

Categories were devised for some open-ended questions which might prove useful in subsequent applications of the interviews. For other open-ended questions, however, we have experienced the frustration and futility of trying to categorize; sometimes the essence of the response was lost in the process of forcing it into one of a limited number of categories. For instance, early in the 4- and 8-month interviews the question was asked, "What has it been like for you these past few months?" This elicited diverse responses from which the interviewers said they got the mood or tone which would pervade the entire interview, e.g., "I have been thoroughly enjoying my baby," or "I've been feeling very tired." Clearly these are useful bits of information and can be clinically integrated to add to the overall assessment picture--as screening or research data they are hard to systematize.

Interviewing mothers is not a new idea; nurses and others in the field of health care have been doing it for years. The perspective added by these particular interviews focuses on a) the resources of the mother which can help support her in her maternal role, b) the concerns she is experiencing about her child, c) her perceptions of the child, and d) her expectations about child development. Based on her perception of these factors, the goal is to maximize the satisfaction of motherhood; this is not only a desirable end in itself but is bound to influence the course of her child's development as reflected in her affect and behavior.

## Carey Infant Temperament Questionnaire

Throughout this report we have indicated the importance of what the child brings to his interaction with the environment. What he brings may perhaps be best referred to as "infant temperament," which Carey defines as "the emotional reactivity or behavioral style displayed in the early months of life" (1972, p. 823). Carey has devised a 70-item questionnaire for mothers to assess infant temperament and to assist in pediatric care (Carey, 1972).[1] The approach used is to ask mothers about child behaviors and reactions in specific situation, such as bathing, feeding, and being with strangers. The specific focus of the questions was designed to minimize the bias of global maternal ratings of temperament. The items can be rated in nine categories of temperament: activity, rhythmicity, adaptability, approach, sensory threshold, intensity, mood, distractability, and persistence. In addition the mothers are asked to make general ratings of their children on the nine categories.

Based on the placement in the nine categories of temperament, Carey makes one of four diagnoses: difficult, intermediate high, intermediate low, and easy. The "difficult" infant has four or five of the following characteristics: irregular schedule, low in adaptability, initial withdrawal from new situation, intensity of response, and predominantly negative mood. The "easy" child, of course, has the reverse characteristics. The use of the term "difficult child" is understandable in the context in which the previous investigators have used it, e.g., the child who presents greater challenges in caretaking due to unpredictability, or who offers less satisfying feedback through a negative mood. Although alternatives for this terminology do not come easily, we have chosen to try to find one. It seems important to minimize the connotation of the "difficult," i.e., "impossible," child and to maximize the possible role of parent caretaking behaviors in modifying the problems of children of different temperaments.

In our study the full Carey Temperament Questionnaire was administered to the special cohort at 1, 4, 8 and 12 months of age. At the same ages a modified abbreviated version was used in the home interviews. The interview version included items for some specific activities in each temperament category as well as general maternal ratings. (See for example Appendix 5.4, items 35-59). This design allows comparisons between the full and abbreviated versions, as well as between ratings during the first year of life. For the purposes of this phase of analysis, the data reduction and formation of variable sets from the home interview included only the mother's overall rating of each of the temperament categories. Five of the nine characteristics were selected for an overall temperament score for each child, i.e., mood, rhythmicity, withdrawal, adaptability, and intensity. The score is a summation of the number of "less easy" ratings across areas of temperament. Thus, the five characteristics represent a temperament continuum from "easy" (low) to "less easy."

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[1] His method and the temperament classifications are based on the earlier work of Thomas and associates (Thomas, et al., 1963).

There were significant correlations ($p < .01$) between all time points for the temperament scores: tau ranged from .15 to .33. The mothers' perception of their children's temperament characteristics did show some consistency over time, although the low correlations indicate considerable fluctuation. This is not too surprising since we would expect this rating to vary as a result of many characteristics and perceptions as well as from the influences of developmental changes. On the average, mothers reported the least easy child temperaments at 12 months of age: the median went from .32 at 1 month to .63 at 1 year. It is fair to say though that none of the mothers perceived their babies as being really difficult temperamentally. Only one or two children scored more than two out of the possible five areas of difficulty at any age. This lack of variability of course limits our ability to examine the correlates of temperament perception. At the same time, it is a further sign of the health of our sample children and of their environments during infancy.

The child's temperament rating showed little association with mother's years of schooling. The highest correlation (-.18) was at 8 months (the more educated the mother the more positive the temperament perception). There was a similar lack of relationship with the perinatal risk score.

There were occasional associations shown between the child temperament score and other home interview variables, but they are weak and inconsistent across time. Perhaps the most interesting is the positive relationship between the way the mothers scored their children and the way they scored themselves. At one month the mothers were asked to rate the same areas for their own temperament. The scoring method was the same as for the infants. Mothers who perceived their own temperaments to be easy tended to report the same about their children (tau = .26, $p < .01$). Perhaps this correlation is due, at least in part, to a "rating set" when both are reported at the same interview.

To further understand these general temperament ratings let us turn to the special cohort data. Twenty-four mothers in the special cohort completed the full Carey Temperament Questionnaire at 1, 4, 8 and 12 months. The scoring method and descriptive statistics are shown in Appendix 5.10. It is evident that the full questionnaire identifies more of the intense or difficult aspects of the child's temperament since, when using Carey's classification system on this small group of 24, four infants were classed as difficult at 1 month, four at 4 months, and three at 8 months (none at 12 months).

At the same time the special cohort mothers filled out the full questionnaire they also made general ratings for the nine temperament areas.

The full scores were compared with these three-point general ratings in each temperament area (Table 5.8). At one month only two of the nine reactivity categories show significant relationships (Kendall tau, $p < .05$) between the computed score and the mother's overall rating; these two are Rhythmicity (.28) and Adaptability (.32). At four months, seven of the categories show significant relationships between scores and ratings; threshold of sensitivity and mood are the two exceptions. At eight months, four categories show significant positive relationships between scores and ratings (rhythmicity, .54; approach, .40; distractibility, .36; and persistence, .26) and mood shows a significant negative correlation (-.28). At 12 months, seven categories show significant relationships between scores and ratings; threshold and distractibility are the exceptions. Rhythmicity is the only category which shows significant correlations between scores and ratings at all four time points.

The special cohort mothers' full questionnaire scores were also compared with their home interview general rating scores described earlier in this section. The correlations were even lower than in the previous comparison. (Tau, 1 month = -.24, 4 months = -.21, 8 months = -.27, and 12 months = -.28.)[1]

Carey suggests the use of the temperament questionnaire as a clinical adjunct to obtain as factual a description of the child as possible. If this is the reality the clinician is seeking on which to classify children as easy or difficult, then a discrepant maternal rating on more general scales could be considered biased. This type of truth has value in putting

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[1] The negative coefficients are appropriate since Carey scored difficult temperament low and we scored it high.

## TABLE 5.8

### CORRELATIONS BETWEEN MOTHER'S OVERALL RATINGS AND SCORES FOR NINE CATEGORIES OF INFANT REACTIVITY FROM THE CAREY TEMPERAMENT QUESTIONNAIRE FOR 24 SPECIAL COHORT SUBJECTS AT 1, 4, 8 AND 12 MONTHS

| | | 1 mo. | 4 mo. | 8 mo. | 12 mo. |
|---|---|---|---|---|---|
| | Activity | .16 | .33* | .21 | .30* |
| ** | Rhythmicity | .28* | .33* | .54* | .54* |
| ** | Adaptability | .32* | .40* | .01 | .33* |
| ** | Approach | .20 | .62* | .40* | .37* |
| | Threshold | .22 | .21 | .05 | .22 |
| ** | Intensity | .18 | .32* | -.11 | .24* |
| ** | Mood | .08 | .24 | -.28* | .33* |
| | Distractibility | .19 | .43* | .36* | -.03 |
| | Persistence | .13 | .46* | .26* | .45* |

*Kendall Correlation Coefficients; $p < .05$; Range of N = 21-24.

**Five major categories.

together a clinical picture of temperament problems not perceived as problems by the parent.

On the other hand, the data presented here emphasize another kind of truth, sometimes concordant and sometimes discrepant with a clinician's assessment. A mother's perception of her child's temperament is also a reality and might conceivably even be a determining factor in whether the child clinically diagnosed as difficult is affected developmentally.

Some support for this possibility is shown in Table 5.9. There is little association between the temperament rating given the child by the mother and the observers' ratings of the child's behavior in the teaching interaction: children rated by the mothers as having less easy temperaments show no less attentiveness to the task or involvement in the interaction. More relationship is shown, however, between how mothers rate their babies' temperaments and how they behave toward them: mothers who rate their children less easy temperamentally show less facilitating behavior when teaching their infants.

At any rate, the evidence suggests that the different methods of evaluating or classifying infant temperament are measuring different things. The general maternal rating is not a simpler shorter way of applying the full questionnaire. Whether they are of value in child assessment can only be determined by further tests of predictive validity. Their relationship to the clinical or "more factual" description of temperament and the relationship of both to developmental outcomes remains to be studied in a more heterogeneous sample in which all of the children receive both types of assessments.

## TABLE 5.9

## KENDALL CORRELATIONS BETWEEN CHILD TEMPERAMENT RATINGS AND TEACHING INTERACTION RATINGS FOR EASY AND HARD TASKS

| Months of Age at Assessment | Infant Readiness to Learn |  | Maternal Facilitation |  |
|---|---|---|---|---|
|  | Easy | Hard | Easy | Hard |
| 1 | .08 | -.10* | -.12* | -.19* |
| 4 | .08 | .02 | .00 | .02 |
| 8 | -.03 | .01 | -.21* | -.08 |
| 12 | .01 | .06 | -.15* | -.07 |

* $p < .05$

## The Neonatal Perception Inventory

This inventory was developed by Dr. Elsie Broussard for the purpose of assessing a mother's perception of her baby compared to her idea of the behavior which average babies exhibit. This inventory asks the mother first to rate the "average baby" on six dimensions of behavior: crying, feeding, spitting up, sleeping, elimination, and predictability. Options for responding are on a five-point scale from "none" to "a great deal." The favorable behavior, "none," is scored as "1," and the scores increase to 5 for "a great deal." Scores are summed across the six questions. The mother is then asked to rate her baby on the same factors. The latter score is subtracted from her average baby score to find the amount of discrepancy. The discrepancy constitutes the Neonatal Perception Inventory score. A mother is considered to have a Positive Perception of her baby if she perceives her baby to be better than the average baby (+ score). A mother who perceives her own baby to be the same as or worse than the average baby is considered to have a negative perception of her baby.

Broussard and Hartner (1971) had their population of mothers complete the inventory when the children were 2 days and 1 month of age. The same procedure was followed in this project. For both groups some mothers reported a changed perception between time one and two. While this permits test-retest comparisons, some perceptual changes would be expected during this time as mothers become more familiar with their infants in the home setting.

The type of validity reported so far for this instrument is predictive. Children of mothers who perceive them as having more or as much trouble as the average baby on these behaviors were found to have significantly more emotional developmental deviations at 4½ and 10 years of age (Broussard, 1975).

The Neonatal Perception Inventory (NPI) items were incorporated into the newborn and one month mother interviews and are found in Appendix 5.3 (items 38-49) and in Appendix 5.4 (items 12-23).

At the newborn period 79 percent of our Seattle mothers perceived their babies as better than average; the comparable figure for one month was 77 percent. The data from Broussard and Hartner's study for the same time points show 46 percent and 61 percent (a Pittsburgh sample in 1963). The difference in perception at 2 days of age suggests that the mothers in our sample, for whatever reasons, started with more positive evaluations of their babies.[1]

As in earlier studies using the NPI, we found no associations between the perception score and maternal education, family income, or sex of the baby. There was, however, a moderate correlation between the NPI score at one month and the perinatal risk score (tau = -.11, $p < .05$); the greater the perinatal complications the lower the perception of the baby.

Other associations with the one-month NPI score were noted: mothers with higher scores concurrently reported more psycho-social assets and fewer concerns about their babies. They also perceived their children's temperament more positively.

Considering the individual items on which the mothers rated their own babies during the newborn period, the mothers predicted the greatest behavior difficulties to occur in the areas of crying (61 percent) and spitting-up (52 percent), while few anticipated problems with sleep (12 percent), bowel movements (20 percent), or feeding (30 percent). At one month the majority of the difficulties were perceived by the mothers as occurring in the areas of settling down to predictable behavioral patterns (63 percent) and crying (57 percent), and there were few mothers reporting difficulties in feeding (17 percent). Comparing the mothers' predictions at newborn to their ratings of behavioral characteristics at one month, it appears as if more mothers found their infants to have problems in sleeping and in settling down to predictable schedules than had anticipated these types of problems.

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[1] In a more recent Pittsburgh sample (1973), Broussard found 73 percent of the mothers had positive NPI scores at one month (personal communication).

Although the proportion of positive NPI scores was similar at 2 days and 1 month of age, this does not mean the same mothers were positive or negative at both time points. Four groups of mothers can be formed on the basis of the change or consistency of the mother's perception of her infant at these two time points, i.e., changes between what she thought her infant was like when she had spent only a few days with him in the hospital and how she perceived him after she had spent a month with him. The groups are:

| | Newborn - One Month | N |
|---|---|---|
| 1) | Positive - Positive | 115 |
| 2) | Positive - Negative | 31 |
| 3) | Negative - Negative | 11 |
| 4) | Negative - Positive | 26 |

Since each of the scores within the combined groups consist of a difference score between perception of average baby and perception of own baby, the question arose as to which score the mother was changing. For example, do the mothers in the negative-positive groups score their own babies as easier at one month than at newborn or do they score the average baby as more difficult at one month than at newborn? Either one or both of these possibilities could result in an NPI score at one month which is positive.

In order to answer this question, t-tests were performed between differences in the own baby scores and the average baby scores at each time point for each of the four groups. A summary of the results of these t-tests are presented in Appendix 5.11 and are graphed in Figure 5.1. For the 115 mothers in the positive-positive groups, the change in their own baby score was significantly greater than the change in their average baby score; these mothers who started out with a positive perception of their infants became even more positive when they became better acquainted.

For the 31 mothers in the positive-negative group, the change in the own baby score was also significantly greater; they saw their own babies as being more trouble at one month than they had seen them at birth.

For the 11 mothers in the negative-negative group, there was no significant difference between the score changes. The scores changed little. For the 26 mothers in the negative-positive group, the change in their own baby score was significantly greater than the change in their average baby score; they tended to see their own babies as easier at one month than at newborn.

Figure 5.1 emphasizes the relative stability of the average baby scores for the four groups and the dramatic changes in the own baby scores in the two groups with changes in classification (positive-negative and negative-positive groups).

These patterns of score change suggest possible reasons for the changes in perception. For example, we might hypothesize that mothers in the positive-negative group were positive about their mothering experience at first and then encountered problems, perhaps due to the infant's behavior. Similarly, we might hypothesize that the negative-negative group did not expect to have an easy baby, and nothing happened in the first month to change that expectation. Those in the negative-positive group may have had easier

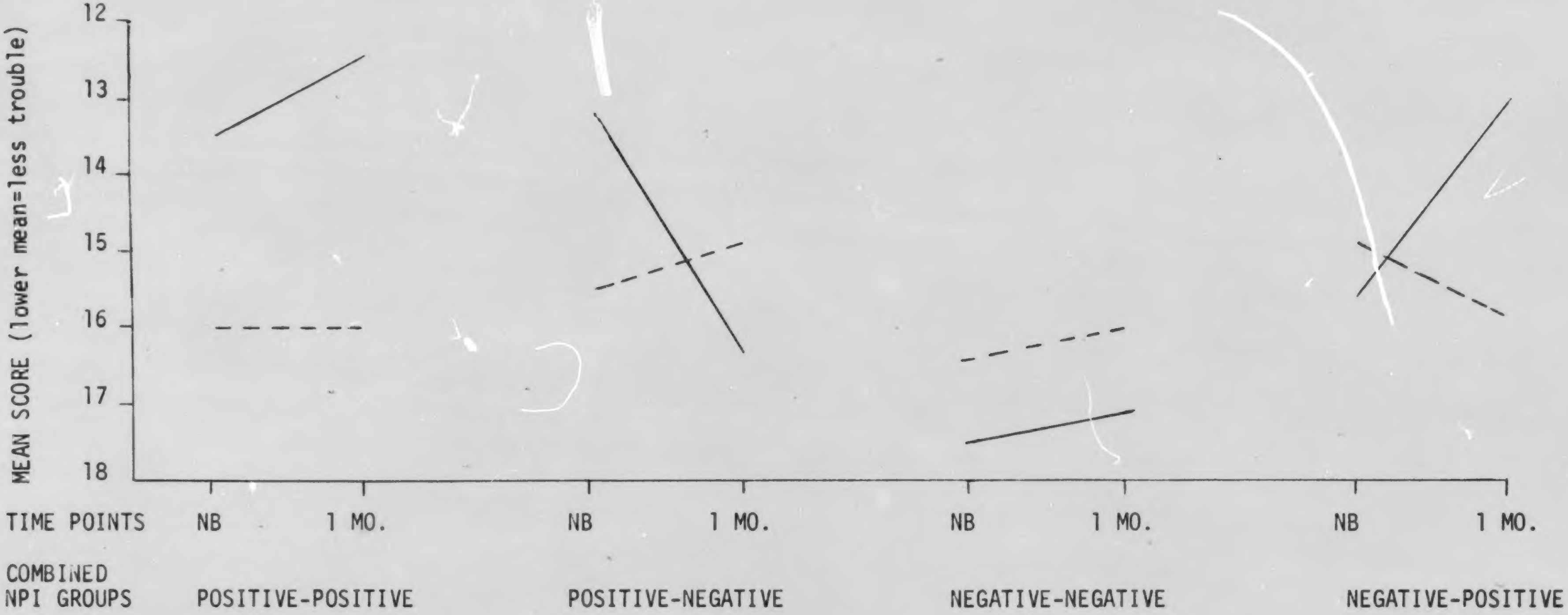

Figure 5.1 Schematic diagram of changes in own baby score (———) and average baby score (------) from newborn to one month for the four Combined NPI groups.

experiences with their infants than they had expected. Were these perceptual patterns associated with something about the infant at birth or at one month, or were there other correlates which would throw light on the subject? To find out we did a discriminant analysis for the four groups.

For prenatal and newborn influences on the combined NPI scores we entered the following variables into the discriminant analysis:

Prenatal environmental influences

- life change (explained in Chapter 6)
- mother's psycho-social assets
- father involvement

Newborn infant characteristics

- perinatal risk score
- gestational age
- neurological suspicion score
- alertness score
- irritability score
- motor score

None of these variables discriminated between the four groups of mothers. This indicates that the change or consistency of the mother's perception of her baby is not explained by her prenatal circumstances or her baby's status at birth (at least as we have measured them).

For one month influences on the combined NPI scores we entered the following variables into the discriminant analysis:

Environmental influences

- life changes
- mother's psycho-social assets
- father involvement

Maternal characteristics

- mother involvement

positive messages
facilitation
techniques
adaptation
temperament

Infant characteristics

readiness to learn
adaptation
regularity of night sleep
temperament

The analysis using these one month variables as potential discriminators of the four NPI groups revealed four significant variables.[1] (The statistics for this discriminant analysis are in Appendix 5.12.) The mean discriminant scores show that these variables tend to separate the positive-negative group from the other groups.

The two groups which did not change their perceptions of their infants between the newborn and one month periods (positive-positive and negative-negative groups) both rated their children as having relatively easy temperaments; they both used relatively few negative messages in the teaching interaction; they had relatively high psycho-social assets and life changes in the first month.

Mothers who changed their perceptions of their infants from negative at newborn to positive at one month also rated their infants' temperaments as relatively easy. They used the most negative messages of the four groups. Their assets tended to be high and their life changes tended to be low.

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[1] The first function was significant with a canonical correlation of .35. The highest weights on this function were for infant temperament (-.67), mother's psycho-social assets (.62), life change (.43), and negative messages (.45).

Mothers who changed their perceptions of their infants from positive at newborn to negative at one month rated their infant's temperament as the most difficult of the four groups. They used relatively few negative messages. Their life changes tended to be low, and their assets were the lowest of the four groups.

The most striking result of this analysis appears to be the separation of the positive-negative group from the other groups. From the earlier analysis we learned that the positive-negative mothers "own baby" scores got worse after a month of living with the children. This suggests that something about these babies caused the maternal perceptions to become negative. The findings from this analysis, however, do not support that idea. The babies of mothers in this group showed no distinguishing characteristics at birth. More importantly, at 1 month of age when the mothers reported negative perceptions, they scored just as well on their behavior during the feeding and teaching interaction as their positively-perceived peers. They also did not differ on their schedule patterns as indicated by regularity of sleep. Their mothers did rate these babies' temperaments as more difficult, but this may say more about the mothers than the children, as discussed in the earlier section on temperament.

Why then did the perceptions of this group of mothers turn negative? Our findings do not suggest that the answer involves maternal behavior, i.e., involvement with the child, feeding and teaching behavior, or the mother's temperament self rating. The positive-negative mothers were observed to give fewer negative messages while teaching their 1-month-olds. This isolated behavior is difficult to interpret, especially since the mothers perceived their children as more difficult.

Perhaps the most insight comes from the low psycho-social assets of this group of mothers. At one month the psycho-social asset score is a combination of the reported feelings about motherhood and about marriage. Mothers with negative feelings about their family role perceive their babies negatively, irrespective of the infants' characteristics or behavior.

This effect of low psycho-social assets does not combine with high life change as one would expect; these positive-negative mothers have less life change than other mothers. Perhaps the changes they expected and wanted from motherhood did not occur.

The amount of variation explained on the discriminant function described here is only 12 percent and the significant variables correctly classify only 28 percent of the mothers into the four groups. Clearly many questions remain about why mothers perceive their infants as they do and why these perceptions change.

## The Developmental Profile

This instrument was designed to assess child development from birth to pre-adolescence (12 years). The aim of those who developed it (Alpern and Boll, 1972) was to devise a screening technique which did not require trained developmental experts or psychologists. This developmental screening is done by interviewing the major caretaker of the child, usually the mother. She is asked whether the child does specific activities appropriate for his current age level. Five developmental areas are assessed, and separate developmental ages for each area are calculated:

Physical: e.g., Does the child use his thumb and fingers or his whole hand to pick up something? Does he go from a creeping to a standing position?

Self-help: e.g., Does the child help with dressing by holding out his arms? Does he go about the house without needing to be watched constantly?

Social: e.g., Does the child show he knows what "my" means? Does he come when he is called?

Academic (i.e., cognitive): e.g., Does the child show likes and dislikes? Does he search in the right place for something which has been moved out of his sight?

Communication: e.g., Does the child sometimes repeat words spoken to him? Does the child answer words with gestures?

The item examples above are age-appropriate for the 6-month to 1-year-old child. In administration, which the test manual clearly explains, items appropriate for earlier ages are first used to establish a base age for the developmental skills. Then the interviewer works upward to and beyond the highest skill level the mother reports the child has achieved to establish a ceiling.

The items and their placement were developed through a standardization study of 3008 subjects in the early 1970s. Subjects were purposely chosen to permit analysis by sex, race, and socioeconomic status so that items biased on these characteristics could be identified and omitted from the screening norms. As part of the standardization study the authors (Alpern and Boll, 1972) tested the validity of the mothers' answers to the skill items against whether the children actually could do the task for an outside observer. The percent of agreement between the mothers and the observers ranged from 84 to 88 for the five developmental areas.

Alpern and Boll report two reliability studies. In the first, 35 teachers scored the same child while watching an interview of the child's mother. All 35 were within two points of the score obtained by the interviewer. In the second reliability study, a small group of mothers were interviewed by two different interviewers two days apart. Sixty-eight percent of the retest scores were within two points of the first test score, 92 percent were within three points with the average difference being 1.74 points.

In our study the inter-recorder reliability on the dual home visits was as follows (Kendall correlations):

| | 8 month (N=22) | 12 month (N=23) |
|---|---|---|
| Physical | .96 | .92 |
| Self-help | .96 | .97 |
| Social | .99 | .96 |
| Academic | .82 | 1.00 |
| Communication | .82 | .96 |

Since the Developmental Profile was developed for screening, the authors present in the manual helpful guidelines for determining any need for further referral and assessment. These guidelines are quite conservative, undoubtedly to reduce the number of false positives which would result if more stringent criteria were utilized.

We used the Developmental Profile on the home contacts at 8 and 12 months of age. We wanted to examine the usefulness of this tool as a part of child health screening by comparing it with the more formal developmental testing. Besides being more efficient in the resources it requires, the Profile involves another aspect of screening/assessment central to this project. Since the information is obtained by maternal report, it is bound to have a perceptual overlay. As has already been stressed in this section, parental perception of the child, in this instance his developmental skills, may offer more potential for predictive screening since it taps something about the environment which will help shape the child in the future.

Although the results of the Developmental Profile were not particularly intended for use as continuous or ordinal data we have used them as such. The comparative rankings make it possible to look more extensively at associations with other variables which would not be possible with categorical analyses.

At 8 months of age none of our sample children scored below the screening criteria in any developmental area. There were some which fell in the borderline range, but by 12 months these children had reportedly caught up to the skills appropriate for their age.

At 12 months of age there was one child rated significantly delayed in the area of social development (social age = 2 months). In the area of communication development there was one borderline (age = 6 months) and one delayed (age = 2 months). The two delays were reported for the same child. It is instructive to look more closely at the study record of this child through the first year of life.

Sally Smith (name fictitious) was born to parents who had planned the pregnancy and reportedly were delighted in every way anticipating her arrival. When Mrs. Smith was asked what she expected her baby to be like she said she didn't know. She did not expect the baby to be aware, see, or hear until several weeks of age. She thought it would be important to talk to the baby at age 6 months. When Sally was 1 month old, after making the home assessments, the home visitor recorded the impression that "this mother needs to be more aware of what children are capable of at this age; she offers little verbal stimulation."

In the subsequent home contacts there was a pattern of poor teaching and feeding interaction and low Home Stimulation Inventory scores. Repeated comments were made about Mrs. Smith's shyness, lack of confidence, and need for reassurance. When completing the 12-month assessment the home visitor summarized: "I believe this mother is fostering dependence. There is little stimulation through play. The Developmental Profile results are not a true reflection of the child's abilities."

In contrast to the mother's low rating of Sally's developmental skills at 1 year, Mr. Smith reported that Sally possessed above average social skills. He thought she was average in all other areas of development. He had no concerns about her development. Nor did Sally's physician: he gave her a good or advanced rating in all areas.

Sally's 12-month Bayley results reinforce the diagnosis of no current developmental problems: her MDI score was 112 and her PDI score was 105. The psychometrist did, however, following the testing, make a note regarding Sally's low energy level. "She was sleepy, but I have never seen (that I can recall) a child this relaxed and non-energetic."

What is the Developmental Profile measuring in this instance? Perhaps it is the mother's lack of self-confidence. Or, perhaps it is something about Sally's low energy level the mother notes in answering questions about whether her child "does" certain tasks. Or it may be a reflection of attitudes or stimulation in the child's environment which may influence her future developmental status.

Sally and her mother are unique in our sample, however. Most of the children were perceived by their mothers to perform at or above their age in all developmental areas on the profile. The median developmental ages reported is further evidence of the positive perceptions held by our sample families (Table 5.10).

The distributions of Bayley scores do not lend themselves to categorical

## TABLE 5.10

### MEDIAN DEVELOPMENTAL AGES (IN MONTHS) FROM THE DEVELOPMENTAL PROFILE

| Area | Chronological Age<br>8 months | <br>12 months |
|---|---|---|
| Physical | 9.80 | 14.29 |
| Self Help | 9.89 | 12.89 |
| Social | 11.57 | 16.46 |
| Academic | 11.74 | 14.33 |
| Communication | 9.54 | 14.33 |

## TABLE 5.11

### KENDALL CORRELATIONS BETWEEN DEVELOPMENTAL PROFILE AGE RATINGS AT 8 AND 12 MONTHS AND BAYLEY SCORES AT 12 MONTHS

|  | MDI |  | PDI |  |
|---|---|---|---|---|
| Area | 8 mo. | 12 mo. | 8 mo. | 12 mo. |
| Physical | .08 | .10* | .22* | .31* |
| Self Help | .10* | .07 | .01 | .13* |
| Social | .16* | .11* | .08 | .16* |
| Academic | .13* | .18* | .08 | .17* |
| Communication | .02 | .17* | .02 | .20* |

*p< .05

comparison with the Developmental Profile; few children had low scores at 12 months. Further, no area of the Profile is really parallel with the contents of the Bayley. It is worthwhile, however, to note the rank order correlations between the two (Table 5.11). They are low, and some do not differ from chance expectations. On the whole, our data do not suggest concordance between the Developmental Profile screening results and Bayley testing during infancy to evaluate developmental status per se. This is probably due in large part to the lack of variability in our sample and to our sample's positive nature.

The complexity of factors influencing the Developmental Profile is further shown by the correlations between the 8 and 12 month scores. Tau ranges from .21 to .31 for the five areas. Although all are significant at the .01 level or less, they do not indicate substantial agreement between the mother's reports over time. Further, when one examines the data for individual children, it is not simply a matter of not maintaining rank order over time; some infants were given lower developmental ages at 12 months than they were at 8 which indicates inconsistent reporting on some of the same skill items.

Variability of reporting is also seen across developmental areas at each time point. Correlations among the five areas at 8 months range from .14 to .42 and from .14 to .41 at 12 months. Thus, children are not rated similarly in different developmental skills. It is impossible to tell whether this is due to actual differences in the children or to differing emphasis of maternal perception and/or reporting.

We looked at associations with other perception variables from the home interview to see if they could help explain the Developmental Profile reports. Neither at 8 nor 12 months were any correlations of practical or statistical significance found which would increase our understanding. The same was true for the potential relationships between the mothers' reporting on this instrument and their behaviors during interaction with their children--none were found. These negative findings do not negate the potential value of the Developmental Profile in predictive child screening/assessment; further evaluation will be made of its usefulness when long-term developmental outcomes are available.

### Father's Questionnaire

Because of the enthusiastic interest of many of the fathers during the year of data collection and because of our own interest in fathers and their influence on the child, a questionnaire was left for all of the fathers at the 12-month home visit (Appendix 5.13). Most of the questions were similar to ones asked of the mother, i.e., father's perception of the child's growth, development, and temperament as well as the father's involvement in the child's caretaking. There were also questions about his feelings regarding fatherhood, his concerns, and his achievement expectations for the child.

Of the 164 fathers who received questionnaires, 121 completed and returned them (74 percent). Compared to those who did not return the questionnaire, those who did were older and more of them had boy babies. Both they and their wives had more schooling (Table 5.12). It is highly likely that the one out of four fathers who did not return their questionnaires differed in other important ways from the three who did. While the data have limitations for describing the entire sample of fathers, they do offer still more evidence of the positive environments in which our sample children are developing. They help to complete the perceptual pictures provided by the mothers.

## TABLE 5.12

## CHARACTERISTICS OF FATHERS BY QUESTIONNAIRE RETURN

| | Fathers who returned (N=121) | Fathers who did not return (N=43) |
|---|---|---|
| Mean years of age | 28.4 | 25.7 |
| Mean years of schooling | 15.4 | 13.8 |
| Had male baby | 50% | 43% |
| Wife educated beyond high school | 67% | 50% |

## TABLE 5.13

## PERCENT OF FATHERS WHO PARTICIPATED IN SPECIFIC ACTIVITIES WITH THEIR BABIES BY PERIOD OF INFANCY AND SEX OF BABY

| Activity | 1st 6 Months | | | 2nd 6 Months | | |
|---|---|---|---|---|---|---|
| | Female | Male | Total | Female | Male | Total |
| Diapering | 50.0 | 45.0 | 47.0 | 50.0 | 45.0 | 47.0 |
| Feeding | 50.0 | 40.0 | 43.9 | 53.8 | 45.0 | 48.5 |
| Bathing | 26.9 | 35.0 | 31.8 | 34.6 | 45.0 | 40.9 |
| Dressing | 50.0 | 45.0 | 47.0 | 53.8 | 47.5 | 50.0 |
| Soothing | 53.8 | 47.5 | 50.0 | 53.8 | 45.0 | 48.5 |
| Playing | 53.8 | 47.5 | 50.0 | 53.8 | 47.5 | 50.0 |
| Teaching | 50.0 | 42.5 | 45.5 | 53.8 | 47.5 | 50.0 |

The frequency distributions of the fathers' responses (Appendix 5.14) show they hold their children's developmental capabilities in high regard. They were asked to rate their infants on six areas of development: Physical, self-help, social, intellectual, and receptive and expressive language. They rated them highest on social skills with nearly one-fourth saying their child was "much above average." The fewest children were rated above average and the most below average on expressive language, but even so there were only 10 percent in the latter category. Most of the fathers also thought their infants had easy temperaments, i.e., they were adaptable, happy, and accepting. There was little difference in the developmental ratings by sex of the child except that more boys were viewed as "much above average" on physical and social development.

They reported the most enjoyable aspects of being a father as: being proud of their children, observing the infants' activities, and playing with them. Their satisfaction and enjoyments as fathers showed no relationship to whether they had a girl or boy baby.

The fathers who shared their thinking with us expressed many concerns about fatherhood; their meaning comes through most clearly when individual comments are examined. Collectively, however, they found fatherhood hardest because of the patience required, the responsibility, and the lack of time to devote to the family and to relax. Forty-three percent said they had "very good" feelings about fatherhood, but another 40 percent said their feelings were neutral.

We asked the fathers how they participated in the care and rearing of their infants. Table 5.13 shows their responses. Only about half did any of the physical care, such as diapering, feeding and dressing. Similar proportions interacted with their children through play and teaching. Although the analysis has not yet been done to find out, it is likely the same fathers participated in all activities. Or there may be patterns of activities which go together for different fathers. When asked whether they were satisfied with the activities in their role, only two fathers expressed dissatisfaction and 81 percent said they were very satisfied. Some fathers are quite satisfied, then, to have little participation in the care of their children.

Only a few fathers reported the child's sex identification as an important part of their role. Much of the literature about the paternal role is devoted to the importance of the father's presence and involvement for the child's sex identification (Nash, 1965). These fathers are undoubtedly serving this function but are also focusing on other aspects of father-child relationships as well.

Since many of the fathers' questions were similar to those asked of the mothers it is possible to compare answers for the parent couples in which both responded.

More than half of the mothers (63 percent) had concerns about the child's temperament; only a few of the fathers (18 percent) had such concerns.[1] In the 16 cases where the mother and father agreed there was a temperament problem, only five couples agreed on the nature of the problem.

Less than half of the mothers (32 percent) had concerns about the child's development, and only a few of the fathers (15 percent) had any developmental concerns. Of the nine cases where the mother and father agreed there was a developmental problem, only four of the couples agreed on the nature of the problem.

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[1] Mothers' temperament concerns were frequently about the child's level of activity which made it hard to keep up with them. Fathers were more concerned about the child's persistence in doing something bothersome. Both parents reported the disruption and inconvenience to the family of childrens' irregular scheduling.

Since mothers usually spend more time with children and are more involved in caretaking, they may be expected to voice more concerns. These data illustrate the added dimension of problem definition, however, when fathers do not share the mothers' concerns or have different ones. Clearly both parents should be involved in defining the problem and in implementing a plan of action.

The parents showed little agreement on how successful they thought their child would be in school ($\tau = .01$). On the average, mothers expected their child to do better than did the father ($t = 3.54$, $p < .05$). The parents showed more agreement on how far the child would go in school ($\tau = .47$, $p < .05$), but, in this instance the fathers had somewhat higher expectations. They thought their children would achieve a greater amount of education ($t = 2.11$, $p < .05$). Parents showed a difference in emphasis between quantity and quality of scholastic performance.

Both parents were asked how much their child had changed their lives. There was little similarity in their responses ($\tau = .16$, $p < .05$). Both husbands and wives reported a greater change for the mothers. The mothers actually saw the change for them as even greater than did the fathers ($t = 3.52$, $p < .05$). The impact of the child on the parents' life style is undoubtedly a function of their degree of involvement in the child's care and the amount of time spent with the family. Since the mothers were more involved we would expect the change to be greater for them than for the fathers.

The fathers who responded to our questionnaire were on the whole positive participating parents. While they may be selectively different from the non-responders in this respect, their reports have emphasized several points:

a) As important participants in child-rearing activities and parent-child interaction, fathers also have perceptions which contribute to the child's environment and to his growth and development.

b) Fathers are also influenced by the child's presence; they must adapt to the temperaments and scheduling of their children. From their proximity and role of responsibility they develop concerns about their babies.

c) The concerns and perceptions of the two parents are sometimes different. Assessment for problem solving must consider both views in working toward more optimal child environments.

## SUMMARY

What have we learned about parent perceptions and their place in child health assessment? First, from our experience, obtaining perceptual information is quite feasible; parents are willing and pleased to share their expectations, views and concerns. Furthermore, it is possible to elicit this information systematically through protocols developed to cover sets of information. Care should be taken, however, that in the practice situation the structure of the protocol does not negate the real essence of what parents have to say. Practitioners will require skill in hearing what is important and putting it together from a directly knowledgeable perspective rather than from behind a set of questions *per se*.

The perceptions of parents are not always congruent with more objective assessments. We need to know more about why they differ, which parents differ, and what these differences predict. Parent perceptions of infants also change over time. We need to know more about why they change and the meaning of the change for predictive child health assessment. Further knowledge about the formulation and dynamics of parental perception of the young infant and their role in child development will be forthcoming as this study progresses. Meanwhile, our experience and that of other investigators suggests that, while the child undoubtedly plays a part in how he is perceived, the more direct and underlying causes probably rest with the parent. Pursuing these is essential if care activities are to be constructive rather than intrusive.

For example, Broussard and her colleagues have held group therapeutic sessions for mothers with negative perceptions of their infants. The problems found in these groups demonstrate the long-term, complex attitudes the mothers have about themselves. As Broussard shared her experiences in trying to do something to help negative NPI mothers and their babies, it helped us to understand some of the implications for nursing care if this instrument is to be used as an assessment tool. Direct demonstrations and telling the mother the "right" way to care for her infant can harm rather than help a mother who already lacks self-esteem and confidence in her ability to be a mother. The same detrimental effect can be seen when health personnel inadvertently come between the mother and infant and take the side of the baby in an attempt to improve his care from the mother. Rather, those in the care role must be patient, not critical, pick up the themes of anxiety as the parent presents them, and demonstrate indirectly by example in interacting with the child and the parent.

Our perceptual data have indicated several possible avenues of potentially beneficial care to help parents and thereby their children:

- Parents do not automatically know the capabilities and responsiveness of young babies. They have impressions about what to expect from their infants as they develop but some parents expect too little, thus underrate the importance of their effect on the child from birth. This may be a worthwhile addition to perinatal education.
- Not all mothers have supportive, satisfying environments in which to carry out their child-rearing responsibilities. Understanding the effects of the larger environment on the mother may assist in diagnosing child care problems and in suggesting specific types of support which may be summoned from outside the family.
- All parents do not have positive feelings about parenthood, about their baby, or about the changes resulting from the addition of a new family member. Negative perceptions must be recognized and accepted in order to help parents adapt as well as possible given the child's characteristics, the home environment, and the life situation.

In our view parental perceptions play an important role in child health assessment. Even though more understanding is needed about the effects on developmental status, the information can be used to increase the comfort and satisfaction of parenthood. But, the methods and techniques for eliciting the information must be accompanied by the knowledge of what it means and the professional responsibility for doing something positive about it.

APPENDIX 5.1

## SUMMARY AND DESCRIPTIVE STATISTICS FOR PARENT PERCEPTION VARIABLES AT PRENATAL

| Source | Variable | Composition of Variable Set | Median | Range | N | Value + Label or Direction |
|---|---|---|---|---|---|---|
| Prenatal Questionnaire | Mother's Psycho-Social Assets | Number of:<br>21. Pleased when found out pregnant (1,2)<br>23. Pleased about pregnancy now (1,2)<br>25. Someone to share concerns (1)<br>27. Enough physical help (1-3)<br>29. Enough emotional help (1-3)<br>31. Free time (1)<br>19. Planned pregnancy (1)<br>20. None to little disruption in plans (1,2) | 6.98 | 2-8 | 187 | high=more assets |
| | Father Involvement | Number of:<br>22. Pleased when found out pregnant (1,2)<br>24. Pleased about pregnancy now (1,2)<br>28. Gave most physical help (1)<br>30. Gave most emotional help (1)<br>26. Shared mother's concerns | 4.93 | 0-5 | 187 | high=more involvement |
| | Developmental Expectations | Average (in weeks) of:<br>13. Age baby aware of surroundings<br>14. Age baby begin to learn<br>15. Age baby see<br>16. Age baby hear<br>18. Age mom talk to baby | 6.45 | 1.0-33.2 | 174 | high=older |
| Newborn Interview | Labor & Delivery Experience | Individual score:<br>36. Rating of labor and delivery experience (1-5) | 2.12 | 1-5 | 190 | high=bad experience |
| | Neonatal Perception Inventory-Newborn-Ordinal | Difference Between:<br>38-49. average baby-own baby | 1.81 | -4 to +10 | 187 | high=positive perception |
| | Neonatal Perception Inventory-Newborn-Nominal | Nominal Score:<br>Recoding of above ordinal score | --- | --- | 187 | 1-positive<br>2-average or negative |
| One Month Interview | Mother's Psycho-Social Assets | Number of:<br>67. Satisfied with marriage (1)<br>79. Positive feelings re motherhood (1) | 1.79 | 0-2 | 189 | high=more assets |
| | Father Involvement | Number of:<br>25. Moderate to great participation in child care (3-5)<br>26. Participates in 4 or more caretaking activities<br>78. Child-related concerns (2-4,8) | 1.77 | 0-3 | 189 | high=more involvement |
| | Mother Involvement | Number of:<br>27. 3 hrs or more total time with infant/day<br>28. Teaches one or more things<br>77. Child-related concerns (2-4,8) | 2.03 | 0-3 | 189 | high=more involvement |

APPENDIX 5.1 (continued--page 2)

| Source | Variable | Composition of Variable Set | Median | Range | N | Value + Label or Direction |
|---|---|---|---|---|---|---|
| One Month Interview continued | Parent Mutuality | Number of:<br>61. Joint decisions re important child matters (1)<br>60. Joint decisions re non-child matters (1)<br>66. Moderate to great agreement re child-rearing | 2.18 | 0-3 | 189 | high=more mutuality |
| | Child's Temperament | Number of:<br>57. Mood (3)<br>40. Rhythmicity (3)<br>44. Approach-Withdrawal (3)<br>48. Adaptability (3)<br>49. Intensity (1) | 0.32 | 0-3 | 186 | low="easy" |
| | Mom's Temperament | Number of:<br>75. Mood (3)<br>69. Rhythmicity (3)<br>70. Approach-Withdrawal (3)<br>71. Adaptability (3)<br>72. Intensity (1) | 0.46 | 0-3 | 186 | low="easy" |
| | Mother's Concerns about Infant | Number of:<br>39. Concerns re sleeping (1)<br>17. Concerns re feeding (1) (One month feeding interview) | 0.39 | 0-2 | 189 | high = more concerns |
| | Neonatal Perception Inventory-One Month-Ordinal | Difference between:<br>12-13. Average baby-Own baby | 2.40 | -6 to +11 | 189 | high = positive perception |
| | Neonatal Perception Inventory-One Month-Nominal | Nominal Score: recoding of above ordinal score | --- | --- | 189 | 1-positive<br>2-average or negative |
| | Neonatal Perception Inventory-Change between Newborn & One Month | Nominal Score: combined newborn & one month scores | --- | --- | 183 | 1-positive-positive<br>2-negative-negative<br>3-positive-negative<br>4-negative-positive |
| Four Month Interview | Mother's Psycho-Social Assets | Number of:<br>61. Positive feelings re motherhood (1)<br>4. Positive experiences since 1 mo. (1)<br>29. Satisfied with partner's caregiving (1) | 2.83 | 0-3 | 177 | high=more assets |
| | Father Involvement | Number of:<br>28. Moderate to great participation in child care (3-5)<br>30. Participates in 4 or more caretaking activities<br>31. Teaches one or more things<br>32. 2 hrs. or more with infant/day<br>64. Child-related concerns (2-4,8) | 3.08 | 0-5 | 177 | high=more involvement |
| | Mother Involvement | Number of:<br>33. 4 hrs. or more total time with infant/day<br>35. Teaches one or more things<br>63. Child-related concerns (2-4,8) | 2.00 | 0-3 | 177 | high=more involvement |
| | Child's Temperament | Number of:<br>58. Mood (3)<br>42. Rhythmicity (3)<br>46. Approach-Withdrawal (3)<br>50. Adaptability (3)<br>51. Intensity (1) | 0.42 | 0-3 | 177 | low="easy" |
| | Mother's concerns about Infant | Number of:<br>41. Concerns re sleeping (1)<br>17. Concerns re feeding (1) (4-mo. feeding interview) | 0.39 | 0-2 | 179 | high=more concerns |

APPENDIX 5.1 (continued--page 3)

| Source | Variable | Composition of Variable Set | Median | Range | N | Value = Label or Direction |
|---|---|---|---|---|---|---|
| Eight Month Interview | Mother's Psycho-Social Assets | Number of:<br>61. Positive feelings re motherhood (1)<br>4. Positive experiences since 4 mo. (1)<br>29. Satisfied with partner's caregiving (1) | 2.87 | 0-3 | 162 | high=more assets |
| | Father Involvement | Number of:<br>28. Moderate to great participation in child care (3-5)<br>30. Participates in 5 or more caretaking activities<br>31. Teaches one or more things<br>32. 2 hrs. or more with infant/day | 2.99 | 0-4 | 161 | high=more involvement |
| | Mother Involvement | Number of:<br>33. 4 hrs. or more total time with infant/day<br>35. Teaches one or more things<br>63. Child-related concerns (2-4,8) | 1.91 | 0-3 | 162 | high=more involvement |
| | Child's Temperament | Number of:<br>58. Mood (3)<br>42. Rhythmicity (3)<br>46. Approach-Withdrawal (3)<br>50. Adaptability (3)<br>51. Intensity (1) | 0.43 | 0-2 | 159 | low="easy" |
| | Mother's Concerns about Infant | Number of:<br>41. Concerns re sleeping (1)<br>17. Concerns re feeding (1) (Eight Month feeding interview) | 0.43 | 0-2 | 165 | high=more concerns |
| Developmental Profile | Physical Development | Individual score:<br>Physical Age in months | 9.80 | 4-16 | 165 | high=more advanced |
| | Self-Help Development | Individual score:<br>Self-Help Age in months | 9.89 | 6-18 | 165 | high=more advanced |
| | Social Development | Individual score:<br>Social Age in months | 11.57 | 4-20 | 165 | high=more advanced |
| | Academic Development | Individual score:<br>Academic Age in months | 11.7[illegible] | 6-20 | 165 | high=more advanced |
| | Communication Development | Individual score:<br>Communication Age in months | 9.54 | 4-16 | 165 | high=more advanced |

APPENDIX 5.1 (continued--page 4)

| Source | Variable | Composition of Variable Set | Median | Range | N | Value + Label or Direction |
|---|---|---|---|---|---|---|
| Twelve Month Interview | Mother's Psycho-Social Assets | Number of:<br>59. Positive feelings re motherhood (1)<br>8. Positive experiences since 8 mo. (1)<br>58. Enough help (1-3) | 2.24 | 0-3 | 178 | high=more assets |
| | Father Involvement | Number of:<br>50. Teaches one or more things<br>56. Most help to mother (1)<br>62. Child-related concerns (2-4,8) | 1.87 | 0-3 | 177 | high-more involvement |
| | Mother Involvement | Number of:<br>46. 2 hrs. or more total time with infant/day<br>49. Teaches one or more things<br>61. Child-related concerns (2-4, 8)<br>45. Child-centered management of time (1) | 2.07 | 0-4 | 176 | high=more involvement |
| | Parent Mutuality | Number of:<br>43. Moderate to great agreement re child rearing (3-5)<br>42. Moderate to great agreement re discipline (3-5) | 1.97 | 0-2 | 171 | high=more mutuality |
| | Child's Temperament | Number of:<br>34. Mood (3)<br>22. Rhythmicity (3)<br>24. Approach-Withdrawal (3)<br>26. Adaptability (3)<br>28. Intensity (1) | 0.63 | 0-3 | 170 | low="easy" |
| | Mother's Concerns about Infant | Number of:<br>17. Concerns re feeding (1) (12-mo. feeding interview)<br>54. Developmental concerns (1)<br>38. One or more temperament concerns | 1.15 | 0-3 | 178 | high=more concerns |
| | Achievement Expectations | Product of:<br>52. Success in school (high=above average)<br>53. How far in school (high=beyond college) | 5.78 | 2-9 | 131 | high=high expectations |
| Developmental Profile | Physical Development | Individual score:<br>Physical Age in months | 14.29 | 8-24 | 165 | high=more advanced |
| | Self-Help Development | Individual score:<br>Self-help Age in months | 12.89 | 8-22 | 165 | high=more advanced |
| | Social Development | Individual score:<br>Social Age in months | 16.46 | 2-26 | 165 | high=more advanced |
| | Academic Development | Individual score:<br>Academic Age in months | 14.33 | 7-22 | 165 | high=more advanced |
| | Communication Development | Individual score:<br>Communication Age in months | 14.33 | 14.41 | 165 | high=more advanced |

APPENDIX 5.2

UNIVERSITY OF WASHINGTON
School of Nursing
NURSING CHILD ASSESSMENT PROJECT

OFFICE USE ONLY
Code ______

## PRENATAL QUESTIONNAIRE

Mother's Group Health Number ______ Today's Date ______ Month Day Year

Date of Last Menstrual Period ______

Expected Date of Delivery ______ Will this be your first child? 1----Yes
2----No*

*If no, explain ______

Do you anticipate moving outside of Seattle-King County within the next 1½ years?

1----Yes
2----No

## I. PLEASE FILL OUT THE FOLLOWING INFORMATION ABOUT YOURSELF

1. Name ______ LAST FIRST MIDDLE

2. Address ______ STREET APT. NO. CITY ZIP CODE

3. Phone ______

4. Race: (Circle a number)

1----White (Caucasian)
2----Black (Negro)
3----American Indian
4----Oriental
5----Mixed - specify ______
6----Other - specify ______

5. Birthdate ______ MONTH DAY YEAR

6. Marital Status: (Circle a number)

1----Married
2----Divorced
3----Separated
4----Widowed
5----Never married
6----Common-law
7----Other - specify ______

7. How many years of regular schooling have you completed? (Circle a number)

1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - 12 - 13 - 14 - 15 - 16 -
17 - 18 - 19 - 20+

8. Additional Education Completed? (Business, or Trade School)

______
Field Number of Months

Code ______

## II. PLEASE ANSWER THE FOLLOWING QUESTIONS REGARDING YOUR EXPECTATIONS ABOUT YOUR BABY:

9. What do your expect your baby to be like? ______

______

______

10. Some women prefer babies who like to be held and cuddled, while others prefer babies who are more active and exploratory. Which kind of baby do you prefer? (Circle a number)

1----Cuddly
2----Active
3----Both

11. Are you wishing for a boy or a girl? (Circle a number)

1----Very much want a boy
2----Prefer boy, but girl okay
3----No preference
4----Prefer girl, but boy is okay
5----Very much want a girl

12. Is your husband or partner wishing for a boy or a girl? (Circle a number)

1----Very much wants a boy
2----Prefers boy, but girl okay
3----No preference
4----Prefers girl, but boy is okay
5----Very much wants a girl
6----Don't know

13. At about what age do you think your baby will start to be aware of his/her surroundings or know what is going on around him/her? (Write in the age and circle weeks, months, or years)

Age ______ weeks, months, or years

14. At about what age do you think you will start teaching things to your baby?

Age ______ weeks, months, or years

15. At about what age do you think your baby will first be able to see objects and people clearly?

Age ______ weeks, months, or years

Code __________

16. At about what age do you think your baby will first be able to hear sounds and voices clearly?

Age __________ weeks, months, or years

17. How important do you think it is for you to talk to your baby during his/her first year?

1----Not important at all
2----A little important
3----Moderately important
4----Very important
5----Extremely important

18. At about what age do you think talking to your baby will be especially important?

Age __________ weeks, months, or years

III. PLEASE ANSWER THE FOLLOWING QUESTIONS ABOUT YOUR FEELINGS AND CONCERNS REGARDING THIS PREGNANCY:

19. Did you plan to have this baby, or was it a surprise?

1----Planned
2----Surprise
3----Both __________________________ Comments

20. To what extent will this pregnancy and the birth of this baby have interrupted or canceled your future plans (career, employment, education, etc.)? (Circle a number)

1----Not at all
2----Very little
3----Moderate amount
4----A good bit
5----A great deal

Could you explain? ______________________________
______________________________
______________________________

Code __________

21. Women frequently have mixed feelings about being pregnant. Which one of the following feelings best describes how you felt when you found out you were pregnant? (Circle a number)

1----Delighted in every way
2----Generally pleased, but with minor reservations
3----Mixed feelings, some good and some difficult
4----Generally displeased, though could think of some good
5----Totally displeased
6----None of these*

*Please describe ______________________________
______________________________

22. Which of the above feelings in question #21 do you think best describes how your husband or partner felt? __________
Write in number

23. Which of the feelings in question #21 best describes how you feel now? __________(Write in number) If feelings have changed - could you explain ______________________________
______________________________

24. Which of the feelings in question #21 best describes how your husband or partner feels now? __________(Write in number) If feelings have changed, could you explain ______________________________
______________________________

25. What have been your primary concerns during this pregnancy? (with anything)
______________________________
______________________________
______________________________

26. Have you been able to share your concerns and/or feelings with anyone during this pregnancy?

1----Yes*
2----No

*If yes, with whom?
1----Husband
2----Mother
3----Relative
4---Friend
5----Other __________
specify

Code ________

27. How much physical help would you say you have had during this pregnancy? (i.e. housework, lifting, yardwork)

1----A lot more than I needed
2---- More than I needed
3----As much as I needed
4----Less than I needed
5----A lot less then I needed

Comments, if any ________________________________________

________________________________________________________

28. Regarding the physical help you received, who helped you the most?

1----Husband
2----Mother
3----Relative
4----Friend
5----Other ____________________
Specify
6----No one

29. How much emotional support would you say you have had during this pregnancy?

1----A lot more than I needed
2----More than I needed
3----As much as I needed
4----Less than I needed
5----A lot less than I needed

Comments, if any ________________________________________

________________________________________________________

30. Regarding emotional support, who helped you the most?

1----Husband
2----Mother
3----Relative
4----Friend
5----Other ______________
Specify
6----No one

Code ________

31. Are you able to take any free time "just for yourself"?

1----Yes*
2----No

*If yes, what do you do during this time? ____________________

________________________________________________________

# APPENDIX 5.3

UNIVERSITY OF WASHINGTON
School of Nursing
NURSING CHILD ASSESSMENT PROJECT

## NEWBORN FAMILY ASSESSMENT INTERVIEW

Code # ?
Interview Started?

Baby's Group Health Number?
Interviewer?

INTRODUCTION: During your pregnancy you filled out a questionnaire and mailed it to our project. At this time, I want to ask you a few more questions about yourself and your pregnancy, as well as some questions about your husband or partner.

---

### FIRST OF ALL, I WANT TO VERIFY YOUR FULL NAME AND CURRENT ADDRESS....

1. Mother's Name?

2. Mother's Address?

3. Phone?

### NOW, A FEW QUESTIONS ABOUT THE FATHER OF THE BABY ...?

4. Father's Name? 0-----I don't know

5. Father's Birthdate? 0-----I don't know

6. Father's Race? (Read code)
0-----I don't know
1-----White
2-----Black
3-----American Indian
4-----Oriental
5-----Mixed; Specify
6-----Other; Specify

7. How many years of regular schooling has the father of the baby completed? 0-----I don't know

8. How about other schools or training, i.e. business or trade schools, job training? (# months)
0-----I don't know

9. Father's height? 0-----I don't know

10. Father's weight? 0-----I don't know

### SO THAT WE MAY CALL YOU TO MAKE AN APPOINTMENT FOR A HOME VISIT ...?

11. Do you anticipate moving within the next month?
1-----Yes*
2-----No
*If yes, how may we contact you? (Name? Phone?)

12. How long have you lived at your present address?
0-----I don't know
1-----1-5 months
2-----6-11 months
3-----12-18 months
4-----19-24 months
5-----25-30 months
6-----31-36 months
7-----Over 37 months

13. How many bedrooms are in your home?

14. Do you and the father of the baby live at the same address?
1-----Yes
2-----No*
*Why not?
1-----Separated
2-----Divorced
3-----Unmarried
4-----Institution
5-----Service
6-----Other; Specify

15. Besides you, (your husband), and your baby, are there any other persons living in your home? (adults or children)
1-----Yes*
2-----No
*If yes, Relationship to baby? Age? Sex?

### BECAUSE WE ARE INTERESTED IN ALL ASPECTS OF YOUR NEW BABY'S HOME AND FAMILY LIFE, WE WOULD LIKE TO KNOW....

16. What is your religious preference? (Read code)
0-----I don't know
1-----Protestant
2-----Catholic
3-----Jewish
4-----Other; Specify
5-----None

17. What is the religious preference of your husband or partner?(Use code number from above)

18. Considering your and your husband's religion, how much influence will your religious practices and beliefs have on your child? Using this scale (show card), would you say....
0-----I don't know
1-----None
2-----Very little
3-----Moderate amount
4-----A good bit
5-----A great deal

19. How about family customs...Do you have any unique family customs, rituals, styles of living, or habits that may influence how you raise your child?
*If yes, explain:
1-----Yes*
2-----No

20. What languages are spoken in your home? (most of the time)
1-----English
2-----Other?
3-----Other?

### NOW, SOME QUESTIONS ABOUT YOUR HEALTH....

21. Mother's Height?

22. How much did you weigh when you became pregnant?
0-----I don't know

23. Have you ever received treatment for infertility? (difficulty getting pregnant)
1-----Yes*
2-----No
*If yes, how long treated? type of treatment?
TYPE OF TREATMENT
1-----Medical
2-----Surgical
3-----Emotional
4-----Other; Specify

24. Have you had other pregnancies besides this one?
1-----Yes*
2-----No
*If yes, Year? Type of Birth?
1-----Livebirth
2-----Stillbirth
3-----Neonatal death
4-----Miscarriage
5-----Spont. abortion
6-----Elect. abortion

### CONSIDERING FAMILY HEALTH CONDITIONS....

25. At this point, I will read a list of common health conditions and want you to tell me if any have occurred in your family. If so, would you look at this card and tell me the number that identifies the family member---then turn the card over and tell me the number that best describes the severity, the treatment, and the outcome or result of the condition.

A. ASTHMA
B. ALCOHOLISM
C. DIABETES
D. EMOTIONAL OR NERVOUS PROBLEMS
E. EPILEPSY
F. HEARING PROBLEMS
G. HEART DISEASE
H. READING OR LEARNING PROBLEMS
I. MENTAL RETARDATION
J. SICKLE CELL (Negro only)
K. - O. OTHER (write in)

# APPENDIX 5.3 (continued--page 2)

IN THINKING ABOUT THIS PREGNANCY....

26. When did you first see a doctor about this pregnancy?
1-----1st prenatal month
2-----2-3rd prenatal month
3-----4-7th prenatal month
4-----8th prenatal month
5-----9th prenatal month

27. How many visits did you make to the clinic or doctor about this pregnancy?
0-----I don't know

28. How many prenatal class sessions did you attend with this pregnancy?
0-----I don't know

NOW, SOME QUESTIONS ABOUT PILLS, DRUGS, ETC. YOU MAY HAVE TAKEN DURING THIS PREGNANCY....

29. Did you take any pills, drugs, medications, or shots during this pregnancy?
1-----Yes*
2-----No

If no, ask: How about Aspirin? Antibiotics? Antihistamines? Vitamins & Iron? Sleeping Pills? Diuretics? Tranquilizers? Anything else?

*If yes, Indicate:

30. Name of Drug? Prenatal Month? How often? Why taken?

31. Did you smoke during this pregnancy?
1-----Yes
*If no, proceed to #35. 2-----No*

32. Which month(s) of your pregnancy did you smoke?

33. What did you smoke?
1-----Cigarettes
2-----Drugs
3-----Other; Specify

34. Approximately how much did you smoke? (Number of lights per day)

NOW I WANT TO ASK YOU SOME QUESTIONS ABOUT YOUR EXPERIENCE IN LABOR AND DELIVERY....

35. First of all, I'm interested in what you thought of your labor and delivery experience - what was it like?

36. Then, if you would consider this scale (hand card), how would you rate your reaction to the whole experience of labor and delivery?
1-----Best experience I've ever had
2-----Exciting and fascinating
3-----Neither pleasant nor unpleasant
4-----Unpleasant or depressing
5-----Worst experience I've ever had
6-----None of the above; Specify

NOW THINKING FOR A MOMENT ABOUT BABIES & YOUNG CHILDREN....

37. Do you think babies are more fun to take care of when they're quite little, or do you think they're more interesting when they're a bit older? (talking, walking, etc.)
1-----When little
2-----When older
3-----Neither
4-----Both
5-----Other; Explain

ALTHOUGH THIS IS YOUR FIRST BABY, YOU PROBABLY HAVE SOME IDEAS OF WHAT MOST LITTLE BABIES ARE LIKE. CONSIDERING THIS SCALE (Hand card), WOULD YOU CHOOSE THE NUMBER THAT BEST DESCRIBES THE AVERAGE BABY IN RELATION TO THE FOLLOWING QUESTIONS:

38. How much crying do you think the average baby does?

39. How much trouble do you think the average baby has in feeding?

40. How much spitting up or vomiting do you think the average baby does?

41. How much difficulty do you think the average baby has in sleeping

42. How much difficulty does the average baby have with bowel movements?

43. How much trouble do you think the average baby has in settling down to a predictable pattern of eating and sleeping?

WHILE IT IS NOT POSSIBLE TO KNOW FOR CERTAIN WHAT YOUR BABY WILL BE LIKE, YOU PROBABLY HAVE SOME IDEAS OF WHAT YOUR BABY WILL BE LIKE... CONSIDERING THE SAME SCALE, WOULD YOU CHOOSE THE NUMBER THAT YOU THINK BEST DESCRIBES WHAT YOUR BABY WILL BE LIKE.

44. How much crying do you think your baby will do?

45. How much trouble do you think your baby will have feeding?

46. How much spitting up or vomiting do you think your baby will do?

47. How much difficulty do you think your baby will have sleeping?

48. How much difficulty do you expect your baby to have with bowel movements?

49. How much trouble do you think your baby will have in settling down to a predictable pattern of eating and sleeping?

NOW, THINKING ABOUT WHAT IT WILL BE LIKE AT HOME....

50. When you go home from the hospital, will you have anyone to help you with the care of the baby and other household chores?
1-----Yes; Relationship?
2-----No

51. Are you satisfied with this arrangement?
1-----Yes
2-----No

IN CONCLUSION:

52. What would you say are your primary concerns at this time, about anything?

53. How about your husband or partner---what do you think are his primary concerns at this time, about anything?

54. THANK YOU VERY MUCH...AS YOU KNOW, ONE OF OUR STAFF MEMBERS WILL WANT TO VISIT YOU AND YOUR BABY IN ABOUT A MONTH. IF WE ARE UNABLE TO REACH YOU AT THE PHONE YOU GAVE US, WHOM MAY WE CONTACT OR WHO IS A RELIABLE PERSON WHO WILL KNOW HOW TO GET IN TOUCH WITH YOU?

55. ARE THERE ANY SPECIAL INSTRUCTIONS OR DIRECTIONS THAT WOULD HELP US FIND YOUR HOUSE?

TIME INTERVIEW COMPLETED?

TOTAL TIME? (minutes)

## APPENDIX 5.4

## ONE-MONTH FAMILY ASSESSMENT INTERVIEW

Interviewer: First Name
Interview Started: Date? Time?

Code # ?
**Names to use during interview:**
**Mother? Baby? Father?**

INTRODUCTION: As you recall--you filled out a questionnaire during your pregnancy, then you were interviewed in the hospital after your baby was born. At this time, I want to ask you more questions about yourself and how your new baby is [illegible]

FIRST OF ALL, YOUR NEW BABY'S NAME IS:

1. Baby's Name?

SINCE YOU WERE INTERVIEWED IN THE HOSPITAL, HAVE THERE BEEN ANY CHANGES IN THE FOLLOWING: (record changes only)

2. Your Name?
3. Address?
4. Phone?
5. Marital Status?

WE ARE ALSO INTERESTED IN ALL THE PLACES YOU LIVED DURING THE TIME YOU WERE PREGNANT:

6. What was your address(s) from the time you became pregnant to the time of delivery?
   1---Same as above
   2---Other*
   3---Other*
   *Street? City? (State, if other than Washington)
   Prenatal Month?
7. Do you anticipate moving within the next three months?
   1---Yes*
   2---No
   *How may we contact you? Name? Phone?
8. We realize that people sometimes do not care or wish to discuss their income with others. If you don't mind, would you look at this card and tell me which number on the card best describes your total family income for the past twelve months (from all sources)?

WE ARE INTERESTED IN ALL PERSONS LIVING IN YOUR BABY'S HOME. SINCE THE LAST INTERVIEW (WHEN THE BABY WAS BORN)---

9. Has anyone moved in or out of your home?
   1---Yes*
   2---No
   *If yes, relationship to child? Age? Sex?
   [illegible]e, In/Out?

NOW SOME QUESTIONS ABOUT YOU AND YOUR NEW BABY--

10. After you brought your baby home from the hospital and during these past few weeks, what has your baby been like?
11. Was this (situation that you just described) different from what you expected?
    1---Yes*
    2---No
    *In what way?

ALTHOUGH THIS IS YOUR FIRST BABY, YOU PROBABLY HAVE SOME IDEA OF WHAT MOST LITTLE BABIES ARE LIKE. CONSIDERING THIS SCALE (hand card), WOULD YOU CHOOSE THE NUMBER THAT BEST DESCRIBES THE AVERAGE BABY IN RELATION TO THE FOLLOWING QUESTIONS?

Broussard Scale

1-----None
2-----Very Little
3-----Moderate Amount
4-----A Good Bit
5-----A Great Deal

12. How much crying do you think the average baby does?
13. How much trouble do you think the average baby has in feeding?
14. How much spitting up or vomiting do you think the average baby does?
15. How much difficulty do you think the average baby has in sleeping?
16. How much difficulty does the average baby have with bowel movements?
17. How much trouble do you think the average baby has in settling down to a predictable pattern of eating and sleeping?

YOU HAVE HAD A CHANCE TO LIVE WITH YOUR BABY ABOUT A MONTH NOW---USING THE SAME SCALE, WOULD YOU CHOOSE THE NUMBER THAT BEST DESCRIBES YOUR BABY IN RELATION TO THE FOLLOWING QUESTIONS:

18. How much crying has your baby done?
19. How much trouble has your baby had feeding?
20. How much spitting up or vomiting has your baby done?
21. How much difficulty has your baby had in sleeping?
22. How much difficulty has your baby had with bowel movements?
23. How much trouble has your baby had in settling down to a predictable pattern of eating and sleeping?

BECAUSE WE ARE INTERESTED IN EVERYONE WHO TAKES CARE OF YOUR BABY...

24. Who takes care of him/her most of the time?
    1-----Mother
    2-----Father
    3-----Other*
    *Relationship?
25. How much would you say your husband or partner does in connection with taking care of the baby? (Hand card with Broussard Scale)
    1-----None
    2-----Very Little
    3-----Moderate Amount
    4-----A Good Bit
    5-----A Great Deal
26. Which of the following activities does your husband or partner do in connection with taking care of the baby? (Read list. May record more than one)
    1-----Changing diapers
    2-----Feeding
    3-----Bathing
    4-----Playing
    5-----Other*
    6-----None
    *Describe
27. Does your baby like for you to spend time with him/her besides the time that you usually spend feeding, diapering, etc.?
    0---I don't know
    1---Yes*
    2---No
    *If yes, what do you do during this time? Length of time? Number of times per day?
28. What thing(s) are you helping your baby to learn at this time? (Do not read list)
    0---I don't know
    1---Nothing
    2---Smile
    3---Head control
    4---His/her name
    5---Other*
    *Describe
29. Some babies seem to enjoy cuddling a lot; others do not care to cuddle at all. (Show card with Broussard Scale Considering this scale, would you say your baby cuddles
30. Has she/he always been this way?
    1---Yes
    2---No*
    *Could you explain
31. Considering this scale (show card with Broussard scale), would you say that you cuddle and sing to your [illegible]

NOW LET'S TALK ABOUT CRYING...

32. How do you feel about your baby's crying?
33. What do you do when she/he cries?
    1---Depends on type of cry (handle accordingly, etc.)
    2---Let her/him cry
    3---Never let her/him cry; pick up immediately
    4---Other*
    *Describe
34. About how long do you usually wait (before you to to her/him about his crying)? (Record # of minutes)

# APPENDIX 5.4 (continued--page 2)

## BABY'S TEMPERAMENT CHARACTERISTICS

WE KNOW THAT BABIES DIFFER IN THE WAY THEY GET ALONG WITH OTHERS AND ADJUST TO THEIR SURROUNDINGS. AT THIS POINT I WOULD LIKE TO ASK YOU SOME QUESTIONS ABOUT WHAT YOUR BABY IS LIKE, HOW SHE/HE IS ADAPTING TO HER/HIS ENVIRONMENT. FIRST OF ALL..... (Temperaments are in parentheses at the beginning of each question. They are not a part of the question, but for your information)

35. (Physical Activity) I would like you to describe your baby's physical movements or activities during sleep, diapering, and bathing (record specific behaviors, i.e. head turning, kicking, squirming, arm and leg movements). a. Sleep; b. Diapering; c. Bathing.

36. In thinking about your baby's physical activity, would you say that most of the time she/he is (read scale):
1---Highly active
2---Moderately active
3---Mildly active

37. (Rhythmicity) Can you count on your baby following approximately the same feeding schedule every day?
1---Yes
2---No
3---Sometimes

38. How about the same sleeping schedule?
1---Yes
2---No
3---Sometimes

39. Do you have any concerns at this time about your baby's sleep habits?
1---Yes*
2---No
*If yes, please explain

40. In regard to being regular or predictable, would you say that your baby is (read list):
1---Regular as clockwork
2---Variable, has a regular pattern but occasionally deviates
3---Irregular, never know

41. (Approach-Withdrawal) What does your baby do when she/he sees something "new" (she/he hasn't seen before)? (Do not read code)
1---Stares or just looks
2---Cries, fusses
3---Turns head or looks away
4---Increases body movements or activity
5---No reaction
6---Other*
*Describe

42. How about strange people? What does he do? (Use code from 41)

43. How about a new place? (Use code from 41)

44. Would you say your baby more often accepts new things, or would you say he more often withdraws from new things?
1---Accepts
2---Variable
3---Withdraws

45. (Adaptability) How about changes--what does your baby do if there is any change in his environment or surroundings, and about how long does it take her/him to adjust or adapt (get used to) to the change? (Record specific behaviors)

46. How about a change in the type or time of her/his feeding? How long does it take her/him to adjust or adapt? (Record specific behaviors)

47. How about a change in sleeping arrangements or routines? How long does it take her/him to adjust or adapt?

48. Would you say that most of the time your baby adjusts and gets used to change, or would you say that she/he usually has difficulty adjusting?
1---Generally adaptable
2---Variable
3---Generally slow to adapt

49. (Intensity of Reaction) In regard to the intensity or loudness with which your baby expresses her/himself and lets you know her/his feelings, is she/he usually quite loud, or is she/he usually soft and quiet?
1---Generally intense and loud
2---Variable
3---Generally quiet

51. (Distractibility) Some children are easily distracted from what they are doing--others are not. If your baby were in the midst of sucking a bottle or breast, what would she/he do if she/he heard a sound or if another person came by?
1---Continue sucking
2---Variable
3---Stop sucking

52. In general, would you say your baby is easily distracted from an activity or usually not distracted at all?
1---Easily distracted
2---Variable
3---Not distracted

53. (Threshold of Responsiveness) How does your baby react to loud noises? (Do not read code; may record more than one number)
1---Startle or jump
2---Cry or fuss
3---Turn to the noise
4---Open eyes, become more alert
5---No reaction
6---Other* *Describe

54. In general, would you say your baby is very sensitive to most noises, or that she/he doesn't pay much attention to most noises?
1---Very sensitive
2---Moderately sensitive
3---Mildly sensitive

55. (Quality of Mood) How can you tell when she/he likes something? (Do not read code)
1---Smiles, laughs
2---Cries, turns away
3---Other* *Describe

56. How about when she/he does not like something? (Record code from above)

57. How would you describe your baby's mood most of the time?
1---Happy, contented
2---Variable
3---Unhappy, discontented

58. (Persistence and Attention Span) Would you say your baby usually sticks with something she/he is doing for a long time or only a few moments (other than eating and sleeping)
1---Long time
2---Variable
3---Momentarily

59. In regard to your baby's persistence and attention span, would you describe a time when she/he has stuck with doing something for a long time? Describe the activity, and estimate the length of time in minutes.

---

DECISION MAKING. NOW I WANT TO ASK YOU A FEW QUESTIONS ABOUT WHO MAKES SOME OF THE DECISIONS IN YOUR FAMILY...

60. First of all, I'm wondering who makes the routine decisions concerning the baby. (For example, decisions about the baby's feeding and sleeping routines, etc.)
1---Joint
2---Mother
3---Father
4---Variable
5---Other* *Explain

61. How about other decisions that may be more important concerning the baby. For example, calling the doctor or deciding on a babysitter. (Record from code above)

62. What about decisions in the home not concerning the baby, who makes those decisions? (Record from code above)

---

NOW A FEW QUESTIONS ABOUT YOUR AND YOUR HUSBAND'S OR PARTNER'S SIMILARITIES AND DIFFERENCES..

63. How much alike are you and your husband or partner?
0---I don't know
1---Very much alike
2---Alike in some ways
3---Not at all alike
4---Other* *Describe

64. In what ways are you different from each other? (If no differences, proceed to #66)

## APPENDIX 5.4 (continued--page 3)

65. With respect to the differences you have just described, would you rather have your baby be like you or your husband or partner?

    0---I don't know
    1---Mother
    2---Husband
    3---Both
    4---Neither

66. How much would you say you and your husband or partner agree on child rearing or how to raise your baby? (Hand card with Broussard Scale)

67. Taking everything together, how do you feel about your marriage or your present relationship and living arrangement? (Read code)

    1---Satisfied
    2---Relatively satisfied
    3---Dissatisfied

---

MOTHER'S TEMPERAMENT CHARACTERISTICS: I have asked you many questions about yourself and your new baby. At this point, I would like to know more about you. I will read some descriptions, traits, or characteristics, and let you tell me which category best describes you.

68. (Activity Level) Considering the amount of physical activity or movement during mealtime, sitting (T.V., reading), sleeping, etc., would you say that your activity is:

    1---High
    2---Medium
    3---Low

69. (Rhythmicity) Considering your regularity in sleeping, eating, etc., would you say that you are:

    1---Fairly regular
    2---Variable
    3---Fairly irregular

70. (Approach-Withdrawal) Considering your response to most new things, would you say your initial (first) reaction to new things is:

    1---Accepting
    2---Variable
    3---Withdrawing

71. (Adaptability) In regard to a change in your routine or schedule, would you say that you are:

    1---Generally adaptable
    2---Variable
    3---Generally slow to adapt

72. (Intensity of Response) Regarding intensity or amount of emotion with which you respond to most situations, would you say that you are:

    1---Generally intense or emotional
    2---Variable
    3---Mildly intense or emotional

73. (Distractibility) Would you say that you are easily distracted or not so easily distracted?

    1---Easily distracted
    2---Variable
    3---Not easily distracted

74. (Threshold of Response) In general, would you say you are highly sensitive to most noises or only mildly sensitive?

    1---Highly sensitive
    2---Variable
    3---Mildly sensitive

75. (Mood) Considering your mood most of the time, and in most situations, would you say that you are:

    1---Generally positive
    2---Variable
    3---Generally negative

76. (Persistence and Attention Span) Considering your persistence and attention span, would you say that you are usually:

    1---Persistent
    2---Variable
    3---Not persistent

NOW, SO THAT WE MAY KNOW MORE ABOUT WHAT YOU HAVE BEEN EXPERIENCING AND WHAT THINGS ARE MOST ON YOUR MIND AT THIS TIME...

77. What would you say are your primary concerns about anything?

78. What would you say are your husband's or partner's concerns at this time about anything?

79. In conclusion, I'm wondering---how do you feel about being a mother?

80. Do you feel these questions allowed you to give me a pretty good idea of what your baby is like?

    0---I don't know
    1---Yes
    2---No

    *If no, what else would you like to tell me about your baby at this time?

TIME INTERVIEW COMPLETED ______________ A.M. / P.M.

TOTAL TIME __________Minutes

# APPENDIX 5.5

UNIVERSITY OF WASHINGTON
School of Nursing
NURSING CHILD ASSESSMENT PROJECT

## FOUR- AND EIGHT-MONTH FAMILY ASSESSMENT INTERVIEW

Interviewer:
Date and time interview started:
Interview: 4 - 8 month

Project Code Number
(4 month) Group Health Number

---

INTRODUCTION: THE QUESTIONS I WILL ASK YOU TODAY ARE SIMILAR TO THE ONES YOU WERE ASKED DURING THE LAST VISIT. THIS IS BECAUSE WE KNOW THAT CHILDREN CHANGE A GREAT DEAL AS THEY GROW AND DEVELOP AND ALSO THAT YOU AS A PARENT ARE HAVING DIFFERENT EXPERIENCES FROM DAY TO DAY. THEREFORE, WE WANT TO LEARN AS MUCH AS WE CAN FROM YOU ABOUT WHAT YOUR CHILD IS LIKE AT THIS AGE AND WHAT YOU ARE EXPERIENCING AS A PARENT.

---

FIRST OF ALL FOR OUR RECORDS:

1. Since our last visit, have there been any changes in your name? Address? Phone Number? or Marital Status?

2. How about changes in the numbers of persons living in your home -- has anyone moved "in or out" since the last visit? (For 3 or more days)

   1----yes*
   2----no

   *IF YES, ASK: Number of adults? children? length of stay? Then ask, What effect did this have on your child?

NOW THINKING ABOUT YOUR CHILD--

3. During these past few months, since our last visit, what has he been like?

NOW ABOUT YOU--

4. What has it been like for you these past few months?

NOW SOME QUESTIONS ABOUT YOUR AND YOUR FAMILY'S HEALTH--
FIRST OF ALL:

5. Could you tell me a little about your health --
   (4 mo. "since your child was born?)"
   (8 mo. "since the last visit?)"

6. Are you or have you been under a doctor's care (during this time)?

   1----yes (regular checkups only)
   2----yes*
   3----no

   *IF YES, ASK: For what reason? and proceed to #8.

7. IF NO (not under a doctor's care), do you feel you should be under a doctor's care?

   1----yes*
   2----no

   *IF YES ASK: WHY?

8. Considering what you have just described would you consider your overall general health to be: (read list)

   1----very good
   2----good
   3----fair*
   4----poor*

   *Comments if different from information above.

NOW SOME QUESTIONS ABOUT YOUR HUSBAND'S HEALTH--

9. Is he under a doctor's care at the present time?

   1----yes (regular checkups only)
   2----yes*
   3----no
   4----I don't know

   *IF YES, ASK: for what reason? and proceed to #11

10. IF NO, ASK: Do you feel he should be under a doctor's care?

   1----yes*
   2----no

   *IF YES, ASK: Why?

11. Would you consider his overall general health to be: (read list)

   1----very good
   2----good
   3----fair*
   4----poor*
   5----I don't know

   *Could you explain?

NOW CONSIDERING YOUR CHILD's health--

12. Is he under a doctor's care at the present time?

   1----yes (regular checkup only)
   2----yes*
   3----no

   *IF YES, ASK: for what reason? and proceed to #14

13. IF NO, ASK: Do you feel he should be under a doctor's care?

   1----yes*
   2----no

   *IF YES, ASK: Why?

14. Would you consider his overall general health to be: (read list)

   1----very good
   2----good
   3----fair*
   4----poor*

   *Could you explain?

15 - 20.
AT THIS POINT, I WOULD LIKE TO KNOW ABOUT ANY ILLNESSES OR CONDITIONS YOUR CHILD HAS HAD (4 mo. "since birth"; 8 mo. "since last interview). Using this card, please tell me the number that describes the illness. For each illness the mother identifies, record: age of child when illness occurred, then use the printed card to record SYMPTOMS, TYPE OF CARE, EFFECT OF ILLNESS ON THE CHILD, AND DURATION OF THE EFFECT.

| | |
|---|---|
| 1----allergy problems | 5----flu |
| 2----asthma | 6----infections |
| 3----colds | 7----rashes |
| 4----colic | 8----any other illnesses or conditions |

IF ILLNESSES:

21. During the time your child was sick, what was it like for you?

22. NOW THINKING FOR A MOMENT ABOUT ACCIDENTS AND INJURIES: CHILDREN SOMETIMES GET INTO THINGS AROUND THE HOME THAT RESULT IN ACCIDENTS OR INJURIES --- Has your child had any accidents or injuries (4 mo. "since birth") (8 mo. "since the last interview")?

   1----yes
   2----no

   IF NO, ASK: How about...
   Falls? (from furniture, stairs, or dropped by someone)
   Ingestions? (drugs, poisons, soaps, objects)
   Burns? (hot water, coffee, clothing, electrical)
   Car accident? (struck by or fall inside of)
   Near drowning?
   Other? (any other thing(s) that might have happened to cause injury to your child?)

23 - 25.
IF YES, record:

   a. Kind of injury (burned hand, head injury)
   b. Age of child when accident occurred
   c. Exactly what happened
   d. Time and place of accident
   e. Type of care (from printed card)
   f. Effect of accident on child (from printed card)
   g. Duration of effect on child (from printed card)

26. IF ACCIDENTS:
   In thinking about these injuries that have happened to your child, how did they affect you?

# APPENDIX 5.5 (continued--page 2)

NOW SOME QUESTIONS ABOUT YOUR CHILD'S CARE:

27. Who takes care of him most of the time?

1----mother
2----father
3----other*

*Relationship?

28. How much would you say your husband does in connection with taking care of your child? (read list)

1----none
2----very little
3----moderate amount
4----a good bit
5----a great deal

29. Is he doing as much as you feel he should be doing? (in connection with taking care of your child?)

1----yes
2----no*

*Could you explain?

30. Men sometimes get more involved in a child's care as a child gets older. What specific things does your husband do with your child at this age? (May record more than one answer)

1----diapering
2----feeding
3----bathing
4----playing
5----sooth/comfort
6----nothing
7----other*

*Describe

31. What are some of the things your husband is helping your child to learn at this time?

32. Considering all the things your husband does with your child, approximately how much time would you say he spends with your child each day?

1----none
2----I don't know

---

NOW THINKING FOR A MOMENT ABOUT YOUR TIME WITH YOUR CHILD--

33. What things does your child like for you to do with him besides feeding, diapering, etc.? (Record activity, length of time, and number of times each day.)

34. How about when you are busy with other things? -- Does he seem to need more of your time?

1----yes*
2----no
3----variable

*IF YES, ASK: How do you handle the situation?

35. What things are you helping your child to learn at this time?

---

CHILDREN MAY BE INFLUENCED BY MANY THINGS AS THEY GROW AND DEVELOP...

36. Could you tell me one thing (person, object, or situation) that you feel has influenced your child the most to this point in his life? What is it about ________ that has influenced your child?

---

JUST AS CHILDREN MAY BE INFLUENCED BY MANY THINGS, WE ALSO KNOW THEY DIFFER A GREAT DEAL IN THE WAY THEY GET ALONG WITH OTHERS AND ADJUST OR ADAPT TO THEIR SURROUNDINGS. AT THIS POINT I AM INTERESTED IN EXACTLY WHAT YOUR CHILD HAS BEEN DOING AND WHAT THINGS YOU HAVE LEARNED ABOUT HIM THESE PAST FEW MONTHS. (Temperaments are in parentheses at the beginning of each question as a point of reference only.)

37. (Physical Activity) I would like for you to describe your child's physical movements or activities during sleep, during diapering, and during bathing. (record specific behaviors, i.e., head turning, kicking, arm and leg movement, etc.

a. sleep b. diapering c. bathing

38. In thinking about your child's physical activity, would you say that most of the time he is ---- (read list)

1----highly active
2----moderately active
3----mildly active

39. (Rhythmicity) Regarding regularity, can you count on your child following approximately the same feeding schedule every day?

1----yes
2----no
3----sometimes

40. How about the same sleeping schedule?

1----yes
2----no
3----sometimes

41. Do you have any concerns at this time about your child's sleep or sleep habits?

1----yes*
2----no

*IF YES, explain

42. In regard to being regular or predictable, would you say that your child is --- (read list)

1----regular as clockwork
2----variable
3----irregular

43. (Approach-withdrawal) Considering the way children react to "new things", what does your child do when he sees something "new" that he hasn't seen before? (do not read list)

1----stares or just looks
2----cries, fusses
3----turns or looks away
4----increases body movements or activity
5----no reaction
6----other*

*Describe

44. How about strange people? What does he do? (record from above)

45. How about a strange or new place? What does he do? (record from list above)

46. Considering your child's reaction to most new things, would you say he is:

1----accepting
2----variable
3----withdrawing

47. (Adaptability) How about changes? What does your child do if there is any change in his environment or surroundings? and about how long does it take him to adjust and get used to the change? (record specific behaviors; exclude sleeping and feeding)

48. What does he do when there is a change in the type of food he is given or a change in the time of eating? About how long does it take him to adjust or adapt? (record specific behaviors)

49. What does he do when there is a change in sleeping arrangements or routines, and how long does it take him to get used to the change?

50. Would you say that most of the time your child is...

1----generally adaptable
2----variable
3----generally slow to adapt

51. (Intensity of Reaction) In regard to the intensity or loudness with which your child expresses himself and lets you know his feelings, is he . . . .

1----generally intense and loud
2----variable
3----generally quiet

52. (Distractibility) Some children are easily distracted from what they are doing, others are not. If your child was hungry and fussing or crying while you were preparing his food, could you distract him and stop his fussing, or would he not be distracted and continue to cry?

1----easily distracted
2----variable
3----not easily distracted

## APPENDIX 5.5 (continued--page 3)

### FOUR- AND EIGHT-MONTH FAMILY ASSESSMENT INTERVIEW (Cont.)

53. Regarding distractibility, would you say that your child is ....(read list)

1----easily distracted
2----variable
3----not easily distracted

54. (Threshold of Responsiveness) How does your child react to loud noises? (do not read list; may record more than one number)

1----startle or jump
2----cry or fuss
3----turn to noise
4----no reaction
5----other*

*Describe

55. In general, would you say that your child is.... (read list) to most noises?

1----very sensitive
2----moderately sensitive
3----mildly sensitive

56. (Mood) How can you tell when your child really likes something? What does he do?

57. How about when he does not like something? What does he do?

58. How would you describe your child's mood most of the time? (read list)

1----happy, contented
2----variable
3----unhappy, discontented

59. (Persistence and Attention Span) Would you say your child usually sticks with something he is doing . . . . (read list) (other than eating and sleeping)?

1----long time
2----variable
3----momentarily

60. In regard to your child's persistence and attention span, would you describe a time when he has stuck with doing something for a long time? Describe the activity, and estimate the length of time in minutes.

I'VE ASKED YOU MANY QUESTIONS ABOUT YOUR CHILD. AT THIS TIME I'M INTERESTED IN YOU AND YOUR CONCERNS....
FIRST OF ALL...

61. I'm interested in how you feel about being a mother?

62. Is this what you expected to feel?

1----yes*
2----no*

*In what way? or could you explain?

IN CONCLUSION--

63. What would you say are your primary concerns at this time about anything?

64. What would you say are your husband's primary concerns at this time about anything?

NOW, SO THAT WE MAY BE SURE WE HAVE NOT LEFT ANYTHING OUT, OR THAT WE HAVE NOT OVERLOOKED SOMETHING THAT MIGHT BE IMPORTANT TO YOU AND YOUR CHILD.....

65. Is there anything else you would like to tell me about yourself, your home, or your child, that would be helpful to us in learning more about children at this age?

1----yes*
2----no

*Comments

66. Do you feel these questions allowed you to give me a pretty good idea of what your baby is like?

1----yes
2----no*

*Comments

TIME INTERVIEW COMPLETED ______________ A.M. / P.M.

TOTAL TIME ______________ MINUTES

# APPENDIX 5.6

UNIVERSITY OF WASHINGTON
School of Nursing
NURSING CHILD ASSESSMENT PROJECT

## TWELVE-MONTH FAMILY ASSESSMENT INTERVIEW

Interviewer/Co-Investigator
Date & Time Interview Conducted

Project Code Number

### FIRST OF ALL FOR OUR RECORDS:

1. Since the last visit have there been any changes in your name? address? phone? or marital status? (record changes only)

2. How about changes in the number of persons living in your home -- has anyone moved "in or out" since the last visit? (for 3 or more days)
   1---yes*
   2---no

   *IF YES, ASK: Number of adults? Children? Length of stay? and, what effect did this change have on your child?

3. At one month we asked about your income. Knowing that financial situations sometimes change, would you select the number on the card that best describes your total family income for the past 12 months from all sources.

### NOW SOME QUESTIONS ABOUT THE FATHER OF THE BABY?

4. What is his occupation?

5. Has he worked steadily since the child was born?
   1---yes
   2---no*
   3---I don't know

   *IF NO, could you explain?

6. Is he contributing to the financial support of your child?
   1---yes
   2---no

   Comments, if any.

### NOW THINKING ABOUT YOUR CHILD

7. During these past few months, since the last visit, what has he/she been like?

### HOW ABOUT YOU

8. What has it been like for you these past few months?

9. Are you working or in school at this time?

   1---yes*
   2---no

   *IF YES, ask:
   (a) number of days per week
   (b) age of child when started
   (c) who takes care of child? (friend, relative, day care, other)
   (d) place of child's care (in or out of home)
   (e) number and approximate age of other persons your child is with during that time
   (f) how does this work out for you--are you satisfied with this arrangement?

10. How many times have you had to change or choose another regular babysitter during the past year?
    If changes, for what reason?

### NOW SOME QUESTIONS ABOUT YOUR CHILD'S HEALTH:

11. We are interested in any illnesses or health problems your child has had since the last visit. Using the card please tell me the number that best describes any illnesses your child has had. (For each illness record: age of child when illness occurred, symptoms, type of care, effect on child, and the duration of the effect on child.)

12. IF ILLNESSES:

    During the time your child was sick, what was it like for you?

### NOW THINKING ABOUT ACCIDENTS AND INJURIES:

13. Has your child had any accidents or injuries since the last visit when he was 8 months of age?
    1---yes*
    2---no

    IF YES OR NO, ask: How about.....
    falls? (furniture, stairs, dropped)
    ingestions?(drugs, poisons, soap, objects)
    burns? (hot water, coffee, clothing, electric)
    car accident?(fall inside of or struck)
    near drowning? (bath, wading pool)
    other? (any other thing that might have happened to cause injury to your child)

14-17. IF ACCIDENTS OR INJURIES, RECORD:

   a. kind of injury (fall, ingestion, etc.)
   b. age of child when accident occurred
   c. exactly what happened
   d. time of day and place
   e. type of care (from card)
   f. effect on child (from card)
   g. duration of effect (from card)
   h. What was it like for the mother? How did it effect her?

### NOW REGARDING YOUR CHILD'S GROWTH AND DEVELOPMENT AND THE WAY HE IS GETTING ALONG IN HIS ENVIRONMENT:

18. What do you enjoy about him the most?

19. What seems to be the hardest part about taking care of him at this age?

20. What is his physical activity like now? Would you say he is:
    1---highly active
    2---moderately active
    3---mildly active

21. Could you describe his physical activity during....
    a. eating
    b. playing by himself
    c. bathing

22. How about his regularity in sleeping and eating? Is he....
    1---regular as clockwork
    2---variable
    3---irregular

23. Could you give me an example that would describe his regularity?

24. How about his approach or reaction to new things, people, and places? Is he....
    1---accepting
    2---variable
    3---withdrawing

25. Could you give me an example that would describe his reaction to....
    a. new things, toys, objects
    b. new people
    c. new places, situations

26. Regarding his adaptability or ability to adjust to changes in his routines, schedules (sleep, eating, environment), is he generally....
    1---adaptable
    2---variable
    3---slow to adapt

27. Could you give me an example that would describe his adaptability to changes in his....
    a. environment and length of time to adapt
    b. eating and length of time to adapt
    c. sleep and length of time to adapt

# APPENDIX 5.6 (continued--page 2)

28. How about the way he expresses himself and lets you know his feelings? Is he generally....
    1---intense and loud
    2---variable
    3---quiet

29. Could you give me an example of the above rating?

30. How about his distractibility at this age? Is he....
    1---easily distracted
    2---variable
    3---not so easily distracted

31. Could you give me an example of the above rating?

32. Regarding his sensitivity to most noises at this age, is he....
    1---very sensitive
    2---moderately sensitive
    3---mildly sensitive

33. Could you give me an example of the above rating?

34. How about his mood most of the time? Is he....
    1---happy, contented
    2---variable
    3---unhappy, discontented

35. Could you give me an example of the above rating, or describe what he is like most of the time?

36. Regarding his persistence and attention span, is he...
    1---persistent
    2---variable
    3---not persistent

37. Could you give me an example of the above rating?

38. Have any of the above characteristics been a problem for you? a. activity b. regularity c. approach d. adaptability e. intensity f. distractability g. sensitivity h. mood i. persistence and attention span?

    *IF YES, Ask, In what way?

NOW SOME QUESTIONS ABOUT DISCIPLINE:

39. How do you teach your child about things he should not touch, or places he should not go? What seems to work the best at this age?
    1---no-no
    2---slap hands
    3---remove objects
    4---remove child
    5---distraction
    6---other*

40. What are some of the things you have had to discipline or punish your child for? How did you handle that?

41. About how often do you have to do this?

42. How much would you say you and your husband agree on ways to discipline your child?
    1---none
    2---very little
    3---moderate amount
    4---a good bit
    5---a great deal

43. How about other areas of child rearing? How much do you and your husband agree about how to raise your child?
    1---none
    2---very little
    3---moderate amount
    4---a good bit
    5---a great deal

44. What are some of the areas in which you and your husband disagree in regard to discipline and child-rearing?

NOW SOME QUESTIONS ABOUT YOUR TIME WITH YOUR CHILD:

45. How do you manage your time now -- caring for your child, getting your housework done and time for yourself?

46. What are some of the things your child likes for you to do just with him (just the two of you) besides feeding and caretaking? (Record activity, length of time, approximate number of times/day)

47. How about when you are busy with other things? Does he seem to need more of your time and attention?
    1---yes*        *IF YES, ask:
    2---no          How do you handle the situation?
    3---variable

48. Where does he play and spend most of his awake time? Does he have free run of the house or are there places that are "off limits?"
    1---run of house        3---playpen
    2---certain rooms only  4---other*

49. What are some of the things you are helping your child to learn at this time?

50. How about your husband? What are some of the things he is helping your child to learn at this time?

NOW SOME QUESTIONS ABOUT THE FUTURE OF YOUR CHILD:

51. What are some of your future plans for him (as far as you have thought about)?

52. How do you think your child will do in school?

53. How far do you think your child will go in school?
    1---less than high school
    2---complete high school
    3---complete trade or business school
    4---complete 1-2 years of college
    5---complete college
    6---beyond college (specify)
    7---other (specify)

CONCERNS:

54. Do you have any concerns at this time about the way your child is growing and developing: (a) physically; (b) socially; (c) intellectually; (d) in self help abilities; (e) in speech and language
    1---yes*
    2---no        *Could you explain?

55. To what extent has your child influenced or changed your life style and/or home environment?

    1---none            4---a good bit
    2---very little     5---a great deal
    3---moderate amount
    If changes: In what way?

56. In thinking back over the past 12 months, what, or who has been the most help to you in your role of being a mother and caring for your child? (Help: physically and/or emotionally)

57. In what way was this person, or situation the most helpful?

58. Was this as much help as you needed?
    1---a lot more than I needed
    2---more than I needed      4---less than I needed
    3---as much as I needed     5---a lot less than I needed

59. At this time, how do you feel about being a mother?

60. Do you plan to have other children?
    1---yes
    2---no        Comments

61. What are your primary concerns at this time about anything?

62. What would you say are your husband's primary concerns at this time about anything?

IN CONCLUSION:

63. What advice or suggestions would you offer a new mother for her first year with her baby?

64. Do you think you have done anything differently as a mother or with your child as a result of being a part of this study?
    1---yes*
    2---no        *Could you explain

    How about: (a) paid special attention to your feedings; (b) paid special attention to your teaching; (c) more attention to special toys or activities; (d) paid more attention to health, illnesses; (e) paid more attention to accidents or accident prevention; (f) paid more attention to child's temperament (activity, regularity); (g) paid more attention to child's language development; (h) paid more attention to baby book or record keeping.

65. So that we may keep in contact, may we have the names of 2 persons who will know how to get in touch with you? Name, Address, Phone, and Relationship.

APPENDIX 5.7

PRENATAL QUESTIONNAIRE FREQUENCY DISTRIBUTIONS

Question

| First Child | N | % |
|---|---|---|
| Yes | 181 | 93.8 |
| No | 5 | 2.6 |
| No response | 2 | 1.0 |
| Missing | 5 | 2.6 |

| Anticipate Moving | | |
|---|---|---|
| Yes | 8 | 4.1 |
| No | 176 | 91.2 |
| No response | 5 | 2.6 |
| Missing | 4 | 2.1 |

| 4 Race | | |
|---|---|---|
| White | 163 | 84.5 |
| Black | 16 | 8.3 |
| Am. Indian | 1 | .5 |
| Oriental | 3 | 1.6 |
| Mixed | 3 | 1.6 |
| Other | 1 | .5 |
| No response | 1 | .5 |
| Missing | 5 | 2.6 |

| 6 Marital Status | | |
|---|---|---|
| Married | 163 | 84.5 |
| Divorced | 1 | .5 |
| Separated | 1 | .5 |
| Widowed | 0 | 0 |
| Never married | 19 | 9.8 |
| Common law | 2 | 1.0 |
| No response | 2 | 1.0 |
| Missing | 5 | 2.6 |

| 7 Years Regular Schooling | | |
|---|---|---|
| Eight | 1 | .5 |
| Nine | 2 | 1.0 |
| Ten | 6 | 3.1 |
| Eleven | 11 | 5.7 |
| Twelve | 63 | 32.6 |
| Thirteen | 16 | 8.3 |
| Fourteen | 13 | 6.7 |
| Fifteen | 7 | 3.6 |
| Sixteen | 26 | 13.5 |
| Seventeen | 31 | 16.1 |
| Eighteen | 5 | 2.6 |
| Nineteen | 3 | 1.6 |
| Twenty | 3 | 1.6 |
| No response | 1 | .5 |
| Missing | 5 | 2.6 |

8 Additional Education (months) N = 44

Median = 9.14
Mean = 11.77
Range = 2-36
Missing = 149

| 9 Expect Baby To Be Like | | |
|---|---|---|
| Don't know | 17 | 8.8 |
| Like other babies | 4 | 2.1 |
| Physical characteristics | 33 | 17.1 |
| Positive temperament | 56 | 29.0 |
| Negative temperament | 1 | .5 |
| Health | 32 | 16.6 |
| Helplessness | 9 | 4.7 |
| Individuality | 7 | 3.6 |
| Other | 3 | 1.6 |
| No response | 26 | 13.5 |
| Missing | 5 | 2.6 |

| 10 Prefer Cuddly Or Active Baby | | |
|---|---|---|
| Cuddly | 9 | 4.7 |
| Active | 9 | 4.7 |
| Both | 165 | 85.5 |
| No response | 5 | 2.6 |
| Missing | 5 | 2.6 |

| 11 Mother Sex Preference | N | % |
|---|---|---|
| Very much boy | 9 | 4.7 |
| Prefer boy, girl okay | 9 | 4.7 |
| No preference | 165 | 85.5 |
| Prefer girl, boy okay | 5 | 2.6 |
| Very much girl | 5 | 2.6 |

| 12 Husband Sex Preference | | |
|---|---|---|
| Very much boy | 21 | 10.9 |
| Prefer boy, girl okay | 75 | 38.9 |
| No preference | 61 | 31.6 |
| Prefer girl, boy okay | 16 | 8.3 |
| Very much girl | 4 | 2.1 |
| Don't know | 5 | 2.6 |
| No response | 6 | 3.1 |
| Missing | 5 | 2.6 |

| 13 Age In Weeks Aware | | |
|---|---|---|
| Birth | | |
| One | 25 | 13.0 |
| Two | 12 | 6.2 |
| Three | 17 | 8.8 |
| Four | 34 | 17.6 |
| Six | 16 | 8.3 |
| Eight | 7 | 3.6 |
| Nine | 23 | 11.9 |
| Ten | 1 | .5 |
| Eleven | 1 | .5 |
| Twelve | 1 | .5 |
| Thirteen | 18 | 9.3 |
| Sixteen | 1 | .5 |
| Seventeen | 6 | 3.1 |
| Twenty | 1 | .5 |
| Twenty-two | 3 | 1.6 |
| Twenty-six | 2 | 1.0 |
| Thirty | 1 | .5 |
| Thirty-one | 1 | .5 |
| Thirty-four | 1 | .5 |
| Forty-three | 2 | 1.0 |
| Fifty-two | 1 | .5 |

| 14 Age In Weeks Teach | N | % |
|---|---|---|
| Birth | 17 | 8.8 |
| One | 54 | 28 |
| Two | 7 | 3.6 |
| Three | 5 | 2.6 |
| Four | 24 | 12.4 |
| Six | 8 | 4.1 |
| Seven | 2 | 1.0 |
| Eight | 2 | 1.0 |
| Nine | 11 | 5.7 |
| Twelve | 2 | 1.0 |
| Thirteen | 23 | 11.9 |
| Fourteen | 1 | .5 |
| Seventeen | 5 | 2.6 |
| Twenty | 1 | .5 |
| Twenty-one | 1 | .5 |
| Twenty-two | 5 | 2.6 |
| Twenty-four | 2 | 1.0 |
| Twenty-six | 14 | 7.3 |
| Thirty-one | 1 | .5 |
| Thirty-two | 1 | .5 |
| Thirty-five | 1 | .5 |
| Thirty-nine | 2 | 1.0 |
| Forty | 1 | .5 |
| Forty-two | 2 | 1.0 |

| 15 Age In Weeks See | | |
|---|---|---|
| Birth | 22 | 11.4 |
| One | 10 | 5.2 |
| Two | 12 | 6.2 |
| Three | 21 | 10.9 |
| Four | 42 | 21.8 |
| Five | 1 | .5 |
| Six | 15 | 7.8 |
| Seven | 1 | .5 |
| Eight | 8 | 4.1 |
| Nine | 28 | 14.5 |
| Ten | 1 | .5 |
| Twelve | 3 | 1.6 |
| Thirteen | 21 | 10.9 |
| Seventeen | 5 | 2.6 |
| Twenty-six | 1 | .5 |
| Thirty-two | 1 | .5 |
| Thirty-five | 1 | .5 |

16 Age In Weeks Hear

| | N | % |
|---|---|---|
| Birth | 22 | 11.4 |
| One | 59 | 30.6 |
| Two | 31 | 16.1 |
| Three | 16 | 8.3 |
| Four | 27 | 14.0 |
| Five | 2 | 1.0 |
| Six | 11 | 5.7 |
| Eight | 2 | 1.0 |
| Nine | 10 | 5.2 |
| Twelve | 1 | .5 |
| Thirteen | 9 | 4.7 |
| Twenty-six | 2 | 1.0 |
| Thirty-five | 1 | .5 |

17 Importance Of Talking To Baby

| | | |
|---|---|---|
| Not important | 1 | .5 |
| Very important | 31 | 16.1 |
| Extremely important | 152 | 78.8 |
| No response | 4 | 2.1 |
| Missing | 5 | 2.6 |

18 Age In Weeks Important To Talk To Baby

| | | |
|---|---|---|
| Birth | 22 | 11.4 |
| One | 85 | 44.0 |
| Two | 10 | 5.2 |
| Three | 6 | 3.1 |
| Four | 11 | 5.7 |
| Six | 5 | 2.6 |
| Nine | 6 | 3.1 |
| Twelve | 1 | .5 |
| Thirteen | 6 | 3.1 |
| Seventeen | 4 | 2.1 |
| Nineteen | 1 | .5 |
| Twenty-two | 1 | .5 |
| Twenty-four | 2 | 1.0 |
| Twenty-six | 11 | 5.7 |
| Thirty-five | 1 | .5 |
| Thirty-eight | 1 | .5 |
| Thirty-nine | 3 | 1.6 |
| Forty-three | 2 | 1.0 |
| Forty-eight | 1 | .5 |
| Fifty-two | 8 | 4.1 |
| Sixty | 2 | 1.0 |
| Ninety-nine | 4 | 2.1 |

19 Planned or Surprise Pregnancy

| | | |
|---|---|---|
| Planned | 104 | 53.9 |
| Surprise | 38 | 19.7 |
| Both | 45 | 23.3 |
| No response | 1 | .5 |
| Missing | 5 | 2.6 |

20 Pregnancy Interrupt Plans

| | | |
|---|---|---|
| Not at all | 73 | 37.8 |
| Very little | 54 | 28.0 |
| Moderate amount | 40 | 20.7 |
| Good bit | 11 | 5.7 |
| Great deal | 8 | 3.6 |
| No response | 2 | 1.0 |
| Missing | 5 | 2.6 |

21 & 23. Feelings When Pregnant

| | Feelings When Pregnant | | Feelings Now | |
|---|---|---|---|---|
| | N | % | N | % |
| Delighted | 89 | 46.1 | 102 | 52.8 |
| Generally pleased | 62 | 32.1 | 66 | 34.2 |
| Mixed | 24 | 12.4 | 14 | 7.3 |
| Generally displeased | 6 | 3.1 | 0 | 0 |
| Totally displeased | 0 | 0 | 0 | 0 |
| None of these | 1 | .5 | 0 | 0 |
| No response | 6 | 3.1 | 6 | 3.1 |
| Missing | 5 | 2.6 | 5 | 2.6 |

22 & 24 Husband's Feelings When Pregnant

| | Husband's Feelings When Pregnant | | Feelings Now | |
|---|---|---|---|---|
| | N | % | N | % |
| Delighted | 91 | 47.2 | 103 | 53.4 |
| Generally pleased | 55 | 28.5 | 58 | 30.1 |
| Mixed | 18 | 9.3 | 8 | 4.1 |
| Generally displeased | 7 | 3.6 | 3 | 1.6 |
| Totally displeased | 4 | 2.1 | 3 | 1.6 |
| None | 2 | 1.0 | 1 | .5 |
| No response | 11 | 5.7 | 12 | 6.2 |
| Missing | 5 | 2.6 | 5 | 2.6 |

25 Primary Concerns (3 responses)

| | N | % | N | % | N | % |
|---|---|---|---|---|---|---|
| Parent health | 53 | 27.5 | 8 | 4.1 | 1 | .5 |
| Child health | 66 | 34.2 | 29 | 15.0 | 1 | .5 |
| Child personality | 3 | 1.6 | 6 | 3.1 | 2 | 1.0 |
| Child rearing | 5 | 2.6 | 5 | 2.6 | 3 | 1.6 |
| Finances | 14 | 7.3 | 9 | 4.7 | 4 | 2.1 |
| Practical | 17 | 8.8 | 7 | 3.6 | 3 | 1.6 |
| Family | 5 | 2.6 | 9 | 4.7 | 8 | 4.1 |
| Parenthood | 2 | 1.0 | 16 | 8.3 | 6 | 3.1 |
| Other | 5 | 2.6 | 9 | 4.1 | 5 | 2.6 |
| Missing | 23 | 11.9 | 96 | 49.7 | 160 | 82.9 |

26 Share Concerns

| | N | % |
|---|---|---|
| Yes | 176 | 91.2 |
| No | 5 | 2.6 |
| No response | 7 | 3.6 |
| Missing | 5 | 2.6 |

Shared Concerns With

| | | |
|---|---|---|
| Husband | 151 | 78.2 |
| Mother | 17 | 8.8 |
| Relative | 1 | .5 |
| Friend | 7 | 3.6 |
| Other | 1 | .5 |
| No response | 11 | 5.6 |
| Missing | 5 | 2.6 |

27 & 29 Physical Help

| | Physical Help | | Emotional Help | |
|---|---|---|---|---|
| | N | % | N | % |
| Lot more | 1 | .5 | 5 | 2.6 |
| More than | 15 | 7.8 | 14 | 7.3 |
| As much as | 154 | 79.8 | 136 | 70.5 |
| Less than | 13 | 6.7 | 26 | 13.5 |
| Lot less | 3 | 1.6 | 3 | 1.6 |
| No response | 2 | 1.0 | 4 | 2.1 |
| Missing | 5 | 2.6 | 5 | 2.6 |

28 & 30 Who Helped Physical

| | Who Helped Physical | | Helped Emotional | |
|---|---|---|---|---|
| | N | % | N | % |
| Husband | 157 | 81.3 | 145 | 75.1 |
| Mother | 15 | 7.8 | 19 | 9.8 |
| Relative | 1 | .5 | 3 | 1.6 |
| Friend | 6 | 3.1 | 14 | 7.3 |
| Other | 2 | 1.0 | 1 | .5 |
| No one | 6 | 3.1 | 4 | 2.1 |
| No response | 1 | .5 | 2 | 1.0 |
| Missing | 5 | 2.6 | 5 | 2.6 |

31 Free Time

| | N | % |
|---|---|---|
| Yes | 160 | 82.9 |
| No | 14 | 7.3 |
| No response | 14 | 7.3 |
| Missing | 5 | 2.6 |

Question

6 Father's Race

| | N | % |
|---|---|---|
| White | 153 | 79.3 |
| Black | 23 | 11.9 |
| Oriental | 5 | 2.6 |
| Mixed | 3 | 1.6 |
| Other | 4 | 2.6 |
| Missing | 5 | 2.6 |

7 Father's Years of Schooling

| | N | % |
|---|---|---|
| Five | 1 | .5 |
| Seven | 1 | .5 |
| Ten | 2 | 1.0 |
| Eleven | 6 | 3.1 |
| Twelve | 48 | 24.9 |
| Thirteen | 14 | 7.3 |
| Fourteen | 23 | 11.9 |
| Fifteen | 4 | 2.1 |
| Sixteen | 32 | 16.6 |
| Seventeen | 22 | 11.4 |
| Eighteen | 14 | 7.3 |
| Nineteen | 10 | 5.2 |
| Twenty | 2 | 1.0 |
| Twenty-one | 4 | 2.1 |
| Twenty-two | 3 | 1.6 |
| Twenty-nine | 1 | .5 |
| Missing | 6 | 3.1 |

1 Anticipate Move

| | N | % |
|---|---|---|
| Yes | 12 | 6.2 |
| No | 179 | 92.7 |
| Missing | 2 | 1.0 |

12 Time @ Present Address

| | N | % |
|---|---|---|
| 1 - 5 months | 35 | 18.1 |
| 6 - 11 " | 40 | 20.7 |
| 12 - 18 " | 46 | 23.8 |
| 19 - 24 " | 19 | 9.8 |
| 25 - 30 " | 14 | 7.3 |
| 31 - 36 " | 11 | 5.7 |
| Over 37 " | 27 | 14.0 |
| Missing | 1 | .5 |

13 Number Bedrooms

| | N | % |
|---|---|---|
| One | 18 | 9.3 |
| Two | 76 | 39.4 |
| Three | 75 | 38.9 |
| Four | 19 | 9.8 |
| Five | 3 | 1.6 |
| Six | 1 | .5 |
| Missing | 1 | .5 |

14 Parents Living Together

| | N | % |
|---|---|---|
| Yes | 172 | 89.1 |
| No | 21 | 10.9 |

Reason Parents Not Together

| | N | % |
|---|---|---|
| Unmarried | 16 | 8.3 |
| Institution | 1 | .5 |
| Service | 2 | 1.0 |
| Other | 1 | .5 |
| Missing | 173 | 89.6 |

15 Others In Home

| | N | % |
|---|---|---|
| Yes | 35 | 18.1 |
| No | 156 | 80.8 |
| Missing | 2 | 1.0 |

16 &
17 Mother's Religious Preference / Dad's Religious Preference

| | Mother's N | Mother's % | Dad's N | Dad's % |
|---|---|---|---|---|
| Protestant | 87 | 45.1 | 74 | 38.3 |
| Catholic | 46 | 23.8 | 33 | 17.1 |
| Jewish | 4 | 2.1 | 6 | 3.1 |
| Other | 27 | 14.0 | 27 | 14.0 |
| None | 28 | 14.5 | 42 | 21.8 |
| Missing | 1 | .5 | 11 | 5.7 |

18 Extent of Religious Influence

| | N | % |
|---|---|---|
| None | 13 | 6.7 |
| Very little | 21 | 10.9 |
| Moderate | 65 | 33.7 |
| Good bit | 46 | 23.8 |
| Great deal | 46 | 23.8 |
| Missing | 2 | 1.0 |

19 Unique Family Customs

| | N | % |
|---|---|---|
| Yes | 42 | 21.8 |
| No | 147 | 76.2 |
| Missing | 4 | 2.1 |

19 Nature of Family Custom (2 responses)

| | N | % | N | % |
|---|---|---|---|---|
| Christian religion | 4 | 2.1 | 1 | .5 |
| Non-Christian religion | 7 | 3.6 | 0 | 0 |
| Family closeness | 10 | 5.2 | 1 | .5 |
| Holiday customs | 4 | 2.1 | 3 | 1.6 |
| Ethnic or racial | 3 | 1.6 | 0 | 0 |
| Child rearing practices | 4 | 2.1 | 1 | .5 |
| Other | 7 | 3.6 | 2 | 1.0 |
| Missing | 154 | 79.8 | 184 | 95.3 |
| Language | 0 | 0 | 1 | .5 |

20 Language In Home

| | N | % |
|---|---|---|
| English | 193 | 100 |

20 Other Languages In Home (2 responses)

| | N | % | N | % |
|---|---|---|---|---|
| Spanish | 6 | 3.1 | 2 | 1.0 |
| French | 2 | 1.0 | 0 | 0 |
| German | 2 | 1.0 | 1 | .5 |
| Japanese | 3 | 1.6 | 0 | 0 |
| Other | 3 | 1.6 | 1 | .5 |
| Missing | 177 | 91.7 | 189 | 97.9 |

26 Month Of First Checkup

| | N | % |
|---|---|---|
| First prenatal month | 42 | 21.8 |
| Second or third prenatal month | 136 | 70.5 |
| Fourth → seventh prenatal month | 12 | 6.2 |
| Eighth prenatal month | 2 | 1.0 |
| Missing | 1 | .5 |

27 Number Of Prenatal Visits

| | | |
|---|---|---|
| Two | 1 | .5 |
| Five | 2 | 1.0 |
| Six | 3 | 1.6 |
| Seven | 7 | 3.6 |
| Eight | 6 | 3.1 |
| Nine | 12 | 6.2 |
| Ten | 24 | 12.4 |
| Eleven | 22 | 11.4 |
| Twelve | 47 | 24.4 |
| Thirteen | 22 | 11.4 |
| Fourteen | 16 | 8.3 |
| Fifteen | 14 | 7.3 |
| Sixteen | 7 | 3.6 |
| Seventeen | 3 | 1.6 |
| Twenty | 1 | .5 |
| Missing | 6 | 3.1 |

| 28 | Number Of Prenatal Classes | N | % |
|---|---|---|---|
| | One | 9 | 4.7 |
| | Two | 4 | 2.1 |
| | Three | 8 | 4.1 |
| | Four | 25 | 13.0 |
| | Five | 12 | 6.2 |
| | Six | 19 | 9.8 |
| | Seven | 11 | 5.7 |
| | Eight | 16 | 8.3 |
| | Nine or more | 59 | 30.6 |
| | Missing | 30 | 15.5 |

| 29 - 30 | Medications Taken During Pregnancy | | |
|---|---|---|---|
| | Vitamin-mineral supplements | 183 | 94.8 |
| | Analgesics | 85 | 44.0 |
| | Cold-cough preparations | 54 | 27.9 |
| | Antacids-antinauseants | 28 | 14.5 |
| | Laxatives | 21 | 10.9 |
| | Diuretics | 10 | 5.2 |
| | Tranquilizers-sedatives | 31 | 16.1 |
| | Other | 17 | 8.8 |

Note: Other information coded but not analyzed includes 1) prenatal month(s) drug taken, 2) frequency, 3) reason (doctor recommended or not).

35 Report Of Labor And Delivery (4 responses)

| | N | % | N | % | N | % | N | % |
|---|---|---|---|---|---|---|---|---|
| Terrible | 73 | 37.8 | 15 | 7.8 | 6 | 3.1 | 3 | 1.6 |
| Beautiful | 69 | 35.8 | 12 | 6.2 | 14 | 7.3 | 2 | 1.0 |
| Different from expected | 7 | 3.6 | 40 | 20.7 | 5 | 2.6 | 0 | 0 |
| Hard work | 8 | 4.1 | 16 | 8.3 | 6 | 3.1 | 1 | .5 |
| Neutral | 12 | 6.2 | 8 | 4.1 | 0 | 0 | 0 | 0 |
| Prepared | 6 | 3.1 | 19 | 9.8 | 8 | 4.1 | 4 | 2.1 |
| Help from drugs | 8 | 4.1 | 21 | 10.9 | 18 | 9.3 | 4 | 2.1 |
| Help from people | 5 | 2.6 | 23 | 11.9 | 19 | 9.8 | 9 | 4.7 |
| Other | 4 | 2.1 | 11 | 5.7 | 14 | 7.3 | 10 | 5.2 |
| Missing | 1 | .5 | 28 | 14.5 | 103 | 53.4 | 160 | 82.9 |

| 36 | Rating Of Labor And Delivery | N | % |
|---|---|---|---|
| | Best experience | 27 | 14.0 |
| | Exciting | 110 | 57.0 |
| | Neutral | 20 | 10.4 |
| | Unpleasant | 23 | 11.9 |
| | Worst experience | 10 | 5.2 |
| | None of these | 2 | 1.0 |
| | Missing | 1 | .5 |

| 37 | Age Of Child Most Preferred | | |
|---|---|---|---|
| | When little | 27 | 14.0 |
| | When older | 62 | 32.1 |
| | Neither | 4 | 2.1 |
| | Both | 95 | 49.2 |
| | Other | 2 | 1.0 |
| | Missing | 3 | 1.6 |

| 38 - 43 | Average Cry | | Average Feed | | Average Spitting | | Average Sleep | | Av.Bowel Movements | | Average Pattern | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % | N | % |
| None | 0 | 0 | 4 | 2.1 | 0 | 0 | 25 | 13.0 | 15 | 7.8 | 2 | 1.0 |
| Little | 13 | 6.7 | 98 | 50.8 | 37 | 19.2 | 135 | 69.9 | 129 | 66.8 | 73 | 37.8 |
| Moderate | 92 | 47.7 | 76 | 39.4 | 128 | 66.3 | 26 | 13.5 | 46 | 23.8 | 93 | 48.2 |
| Good bit | 81 | 42.0 | 10 | 5.2 | 25 | 13.0 | 3 | 1.6 | 1 | .5 | 18 | 9.3 |
| Great deal | 6 | 3.1 | 3 | 1.6 | 1 | .5 | 2 | 1.0 | 0 | [illegible] | 5 | 2.6 |
| Missing | 1 | .5 | 2 | 1.0 | 2 | 1.0 | 2 | 1.0 | 2 | [illegible].0 | 2 | 1.0 |

44 - 49

| Own Baby Crying | N | % | Own Baby Feeding N | % | Own Baby Spitting N | % | Own Baby Sleeping N | % | O.B.Bowel Movements N | % | Own Baby Pattern N | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| None | 1 | .5 | 19 | 9.8 | 6 | 3.1 | 46 | 23.8 | 28 | 14.5 | 10 | 5.2 |
| Little | 75 | 38.9 | 116 | 60.1 | 85 | 44.0 | 124 | 64.2 | 124 | 64.2 | 98 | 50.8 |
| Moderate | 89 | 46.1 | 44 | 22.8 | 86 | 44.6 | 18 | 9.3 | 37 | 19.2 | 71 | 36.8 |
| Good bit | 24 | 12.4 | 11 | 5.7 | 14 | 7.3 | 3 | 1.6 | 2 | 1.0 | 10 | 5.3 |
| Great deal | 2 | 1.0 | 2 | 1.0 | 1 | .5 | 1 | .5 | 0 | 0 | 2 | 1.0 |
| Missing | 2 | 1.0 | 1 | .5 | 1 | .5 | 1 | .5 | 2 | 1.0 | 2 | 1.0 |

50 Anyone Help @ Home

| | N | % |
|---|---|---|
| Yes | 180 | 93.3 |
| No | 11 | 5.7 |
| Missing | 2 | 1.0 |

Who Help @ Home

| | | |
|---|---|---|
| Mother | 129 | 66.8 |
| Relative | 11 | 5.7 |
| Husband | 37 | 19.2 |
| Friends | 4 | 2.1 |
| Missing | 12 | 6.2 |

51 Satisfaction With Help Arrangement

| | | |
|---|---|---|
| Yes | 181 | 93.8 |
| No | 8 | 4.1 |
| Missing | 4 | 2.1 |

52 Mother's Primary Concerns (3 responses)

| | N | % | N | % | N | % |
|---|---|---|---|---|---|---|
| Parent health | 12 | 6.2 | 3 | 1.6 | 3 | 1.6 |
| Child health | 25 | 13.0 | 4 | 2.1 | 1 | .5 |
| Child rearing, personality | 4 | 2.1 | 4 | 2.1 | 2 | 1.0 |
| Child rearing, physical | 44 | 22.8 | 21 | 10.9 | 2 | 1.0 |
| Finance | 8 | 4.1 | 7 | 3.6 | 1 | .5 |
| Practical | 6 | 3.1 | 2 | 1.0 | 5 | 2.6 |
| Family relations | 12 | 6.2 | 13 | 6.7 | 6 | 3.1 |
| Parenthood | 13 | 6.7 | 11 | 5.7 | 2 | 1.0 |
| Other | 7 | 3.6 | 9 | 4.7 | 3 | 1.6 |
| Missing | 62 | 32.1 | 119 | 61.7 | 168 | 87.0 |

53 Husband's Primary Concerns (3 responses)

| | N | % | N | % | N | % |
|---|---|---|---|---|---|---|
| Parent health | 17 | 8.8 | 3 | 1.6 | 2 | 1.0 |
| Child health | 17 | 8.8 | 5 | 2.6 | 0 | 0 |
| Child rearing, personality | 6 | 3.1 | 3 | 1.6 | 1 | .5 |
| Child rearing, physical | 11 | 5.7 | 5 | 2.6 | 3 | 1.6 |
| Finances | 16 | 8.3 | 6 | 3.1 | 1 | .5 |
| Practical | 7 | 3.6 | 1 | .5 | 1 | .5 |
| Family relations | 15 | 7.8 | 6 | 3.1 | 2 | .5 |
| Parenthood | 10 | 5.2 | 7 | 3.6 | 0 | 0 |
| Other | 10 | 5.2 | 4 | 2.1 | 1 | .5 |
| Missing | 84 | 43.5 | 153 | 79.3 | 182 | 94.3 |

Length Interview

Mean = 30.29
Range = 15 - 60 minutes

| Question | | | N | % |
|---|---|---|---|---|
| 5 | Number of Prenatal Moves | | | |
| | | None | 122 | 64.6 |
| | | One | 51 | 27.0 |
| | | Two | 13 | 6.9 |
| | | Three | 2 | 1.1 |
| | | Eight | 1 | .5 |
| | | Missing | | |
| 7 | Expect to Move in Three Months | | | |
| | | Yes | 39 | 20.6 |
| | | No | 148 | 78.3 |
| | | Missing | 2 | 1.1 |
| 8 | Income | | | |
| | | $2-3,000 | 11 | 5.8 |
| | | 3-4,000 | 3 | 1.6 |
| | | 4-5,000 | 7 | 3.7 |
| | | 5-6,000 | 1 | .5 |
| | | 6-7,000 | 5 | 2.6 |
| | | 7-8,000 | 9 | 4.8 |
| | | 8-9,000 | 12 | 6.3 |
| | | 9-10,000 | 17 | 9.0 |
| | | 10-11,000 | 21 | 11.1 |
| | | 11-12,000 | 18 | 9.5 |
| | | 12-13,000 | 11 | 5.8 |
| | | 13-14,000 | 10 | 5.3 |
| | | 14-15,000 | 11 | 5.8 |
| | | 15-20,000 | 35 | 18.5 |
| | | 20-30,000 | 9 | 4.8 |
| | | Over 30,000 | 1 | .5 |
| | | Missing | 8 | 4.2 |
| 10 | Description of Baby | | | |
| | | Responsive | 6 | 3.2 |
| | | Refer to schedule | 22 | 11.6 |
| | | Active | 2 | 1.1 |
| | | Positive temperament | 132 | 69.8 |
| | | Negative temperament | 12 | 6.3 |
| | | Health | 1 | .5 |
| | | Sleep problems | 2 | 1.1 |
| | | Personality | 4 | 2.1 |
| | | Other | 8 | 4.2 |
| | | Missing | 0 | 0 |
| | Baby Description Two | | | |
| | | Responsive | 8 | 4.2 |
| | | Refer to schedule | 30 | 15.9 |
| | | Active | 5 | 2.6 |
| | | Positive temperament | 4 | 2.1 |
| | | Negative temperament | 7 | 3.7 |
| | | Health | 18 | 9.5 |
| | | Sleep problems | 11 | 5.8 |
| | | Personality | 17 | 9.0 |
| | | Other | 21 | 11.1 |
| | | Missing | 68 | 36.0 |
| | Baby Description Three | | | |
| | | Responsive | 2 | 1.1 |
| | | Refer to schedule | 4 | 2.1 |
| | | Active | 3 | 1.6 |
| | | Positive temperament | 3 | 1.6 |
| | | Negative temperament | 3 | 1.6 |
| | | Health | 14 | 7.4 |
| | | Sleep problems | 2 | 1.1 |
| | | Personality | 4 | 2.1 |
| | | Other | 8 | 4.2 |
| | | Missing | 146 | 77.2 |
| 10 | Baby Matches Expectations | | | |
| | | Yes | 102 | 54.0 |
| | | No | 86 | 45.5 |
| | | Other | 1 | .5 |
| | | Missing | 0 | 0 |

| Neonatal Perception Inventory | | | N | % |
|---|---|---|---|---|
| 12 | Average Baby Cry | | | |
| | | None | 0 | 0 |
| | | Very little | 6 | 3.2 |
| | | Moderate amount | 136 | 72.0 |
| | | Good bit | 42 | 22.2 |
| | | Great deal | 5 | 2.0 |
| | | Missing | 0 | 0 |
| 13 | Average Baby Feeding | | | |
| | | None | 1 | .5 |
| | | Very little | 123 | 65.1 |
| | | Moderate amount | 61 | 32.3 |
| | | Good bit | 4 | 2.1 |
| | | Great deal | 0 | 0 |
| | | Missing | 0 | 0 |
| 14 | Average Baby Spitting | | | |
| | | None | 0 | 0 |
| | | Very little | 39 | 20.6 |
| | | Moderate amount | 130 | 68.8 |
| | | Good bit | 20 | 10.6 |
| | | Great deal | 0 | |
| | | Missing | 0 | |
| 15 | Average Baby Sleeping | | | |
| | | None | 24 | 12.7 |
| | | Very little | 137 | 72.5 |
| | | Moderate amount | 24 | 12.7 |
| | | Good bit | 4 | 2.1 |
| | | Great deal | 0 | |
| | | Missing | 0 | |
| 16 | Average Baby Bowel Movement | | | |
| | | None | 13 | 6.9 |
| | | Very little | 127 | 67.2 |
| | | Moderate amount | 44 | 23.3 |
| | | Good bit | 4 | 2.1 |
| | | Great deal | 1 | .5 |
| | | Missing | 0 | |
| 17 | Average Pattern | | | |
| | | None | 0 | |
| | | Very little | 42 | 22.2 |
| | | Moderate amount | 107 | 56.6 |
| | | Good bit | 32 | 16.9 |
| | | Great deal | 8 | 4.2 |
| | | Missing | 0 | |
| 18 | Own Baby Cry | | | |
| | | None | 2 | 1.1 |
| | | Very little | 81 | 42.9 |
| | | Moderate amount | 83 | 43.9 |
| | | Good bit | 18 | 9.5 |
| | | Great deal | 5 | 2.6 |
| | | Missing | 0 | |
| 19 | Own Baby Feeding | | | |
| | | None | 68 | 36.0 |
| | | Very little | 88 | 46.6 |
| | | Moderate amount | 20 | 10.6 |
| | | Good bit | 13 | 6.9 |
| | | Great deal | 0 | |
| | | Missing | 0 | |
| 20 | Own Baby Spitting | | | |
| | | None | 19 | 10.1 |
| | | Very little | 120 | 63.5 |
| | | Moderate amount | 41 | 21.7 |
| | | Good bit | 6 | 3.2 |
| | | Great deal | 3 | 1.6 |
| | | Missing | 0 | |
| 21 | Own Baby Sleeping | | | |
| | | None | 52 | 27.5 |
| | | Very little | 87 | 46.0 |
| | | Moderate amount | 33 | 17.5 |
| | | Good bit | 16 | 8.5 |
| | | Great deal | 1 | .5 |
| | | Missing | 0 | |

| 22 Own Baby Bowel Movement | N | % |
|---|---|---|
| None | 92 | 48.7 |
| Very little | 58 | 30.0 |
| Moderate amount | 28 | 14.8 |
| Good bit | 7 | 3.7 |
| Great deal | 4 | 2.1 |
| Missing | 0 | |

| 23 Own Baby Pattern | | |
|---|---|---|
| None | 14 | 7.4 |
| Very little | 55 | 29.1 |
| Moderate amount | 71 | 37.6 |
| Good bit | 41 | 21.7 |
| Great deal | 8 | 4.2 |
| Missing | 0 | |

| 24 Primary Caretaker | | |
|---|---|---|
| Mom | 182 | 96.3 |
| Dad | 1 | .5 |
| Relative | 4 | 2.1 |
| Mom & Dad | 2 | 1.1 |

| 25 Partner - Caregiving amount | | |
|---|---|---|
| None | 6 | 3.2 |
| Very little | 39 | 20.6 |
| Moderate amount | 72 | 38.1 |
| Good bit | 48 | 25.4 |
| Great deal | 20 | 10.6 |
| Missing | 4 | 2.1 |

| 26 Partner Assists | No | | Yes | |
|---|---|---|---|---|
| | N | % | N | % |
| Diapers | 39 | 20.6 | 150 | 79.4 |
| Feeds | 79 | 41.8 | 110 | 58.2 |
| Bathes | 127 | 67.2 | 61 | 32.8 |
| Plays | 19 | 10.1 | 170 | 89.9 |
| Other | 100 | 52.9 | 89 | 47.1 |
| None | 186 | 98.4 | 3 | 1.6 |

| 27 Mother's Activities with Baby | N | % |
|---|---|---|
| Rocking/singing | 47 | 24.9 |
| Talking | 54 | 28.6 |
| Visual play | 5 | 2.6 |
| Motor play | 13 | 6.9 |
| Unspecified play | 29 | 15.3 |
| In mom's activity | 5 | 2.6 |
| Hold | 30 | 15.9 |
| Other | 1 | .5 |
| Missing | 5 | 2.6 |

| 27 Mother's Activity - Amount of time | | |
|---|---|---|
| Less than 15 mins. | 22 | 11.6 |
| 15 - 29 mins. | 62 | 32.8 |
| 30-44 mins. | 20 | 10.6 |
| 45 - 59 mins. | 41 | 21.7 |
| 1 - 2 hours | 30 | 15.9 |
| 2 - 3 hours | 7 | 3.7 |
| More than 3 hours | 2 | 1.1 |
| Missing | 5 | 2.6 |

| 27 Mother's Activity - Times per day | | |
|---|---|---|
| One | 16 | 8.5 |
| Two | 38 | 20.1 |
| Three | 36 | 19.0 |
| Four | 37 | 19.6 |
| Five | 25 | 13.2 |
| Six | 19 | 10.1 |
| Seven | 4 | 2.1 |
| Eight | 1 | .5 |
| Nine | 7 | 3.7 |
| Missing | 6 | 3.2 |

| 28 Mother Teaches Baby | | |
|---|---|---|
| Doesn't teach baby | 18 | 9.5 |
| Eye skills | 57 | 30.2 |
| Grasping skills | 20 | 10.6 |
| Speech skills | 18 | 9.5 |
| Eating changes | 15 | 7.9 |
| Motor development | 26 | 13.8 |
| Plays toy games | 1 | .5 |
| Personality | 16 | 8.5 |
| Other | 9 | 4.8 |
| Missing | 9 | 4.8 |

| 29 Amount Baby Cuddles | N | % |
|---|---|---|
| Very little | 10 | 5.3 |
| Moderate amount | 36 | 19.0 |
| Good bit | 71 | 37.6 |
| Great deal | 72 | 38.1 |

| 32 How Feel About Crying | | |
|---|---|---|
| Very disturbing | 26 | 13.8 |
| Somewhat disturbing | 28 | 14.8 |
| Normal | 19 | 10.1 |
| Depend on type | 33 | 17.5 |
| Empathy | 4 | 2.1 |
| Feel helpless | 5 | 2.6 |
| Adjusting to it | 14 | 7.4 |
| Doesn't bother | 50 | 26.5 |
| Other | 10 | 5.3 |

| 33 What Mother Does About Crying | | |
|---|---|---|
| Depends on type | 98 | 51.9 |
| Let cry | 10 | 5.3 |
| Never let cry | 20 | 10.6 |
| Other | 61 | 32.3 |

| 34 Minutes Until Mother Responds to Cry | | |
|---|---|---|
| None | 27 | 14.3 |
| One | 43 | 22.8 |
| Two | 27 | 14.3 |
| Three | 10 | 5.3 |
| Four | 4 | 2.1 |
| Five | 46 | 24.3 |
| Six | 2 | 1.1 |
| Ten | 22 | 11.6 |
| Fifteen | 7 | 3.7 |
| Twenty | 1 | .5 |

| 36 Rate Physical Activity | | |
|---|---|---|
| High | 42 | 22.2 |
| Moderate | 132 | 69.8 |
| Mild | 14 | 7.4 |
| Missing | 1 | .5 |

| 39 First Sleep Concern | N | % | Second Sleep Concern N | % |
|---|---|---|---|---|
| None | 142 | 75.1 | 183 | 96.8 |
| Colic - colds | 2 | 1.1 | 1 | .5 |
| Not enough | 8 | 4.2 | 0 | 0 |
| Segment - length | 6 | 3.2 | 1 | .5 |
| Restlessness | 3 | 1.6 | 1 | .5 |
| Irregular pattern | 5 | 2.6 | 1 | .5 |
| Sleep through night | 13 | 6.9 | 1 | .5 |
| Eve bedtime | 2 | 1.1 | 1 | .5 |
| Other | 8 | 4.2 | 1 | .5 |

| 40 Rhythmicity Rating | N | % |
|---|---|---|
| Regular | 17 | 9.0 |
| Variable | 144 | 76.2 |
| Irregular | 27 | 14.3 |
| Missing | 1 | .5 |

| 44 Approach Rating | | |
|---|---|---|
| Accepts | 168 | 88.9 |
| Variable | 17 | 9.0 |
| Withdraws | 1 | .5 |
| Missing | 3 | 1.6 |

| 48 Adaptability Rating | | |
|---|---|---|
| Adaptable | 150 | 79.4 |
| Variable | 30 | 15.9 |
| Slow to adapt | 7 | 3.7 |
| Missing | 2 | 1.1 |

| 49 Intensity Of Reaction Rating | | |
|---|---|---|
| Intense | 62 | 32.8 |
| Variable | 88 | 46.6 |
| Quiet | 38 | 20.1 |
| Missing | 1 | .5 |

### 52 General Distractibility

| | N | % |
|---|---|---|
| Easily distracted | 25 | 13.2 |
| Variable | 73 | 38.6 |
| Not distracted | 89 | 47.1 |
| Missing | 2 | 1.1 |

### 54 Sensitivity To Most Noises

| | N | % |
|---|---|---|
| Very sensitive | 27 | 14.3 |
| Moderate | 90 | 47.6 |
| Mildly sensitive | 71 | 37.6 |
| Missing | 1 | .5 |

### 57 Rate Of Mood Most Of Time

| | N | % |
|---|---|---|
| Positive, happy | 129 | 68.3 |
| Variable | 58 | 30.7 |
| Negative, unhappy | 1 | .5 |
| Missing | 1 | .5 |

### 58 Persistence & Attention

| | | |
|---|---|---|
| Long time | 55 | 29.1 |
| Variable | 89 | 47.1 |
| Momentarily | 43 | 22.8 |
| Missing | 2 | 1.1 |

### 60 Who Makes Routine Decisions Regarding Baby

| | N | % |
|---|---|---|
| Joint | 17 | 9.0 |
| Mother | 161 | 85.2 |
| Baby | 9 | 4.8 |
| Other | 2 | 1.1 |

### 61 Who Makes Important Decisions Regarding Baby

| | N | % |
|---|---|---|
| Joint | 94 | 49.7 |
| Mother | 79 | 41.8 |
| Father | 12 | 6.3 |
| Variable | 1 | .5 |
| Baby | 3 | 1.6 |

### 62 Who Makes Non-child Decisions

| | | |
|---|---|---|
| Joint | 114 | 60.3 |
| Mother | 21 | 11.1 |
| Father | 43 | 22.8 |
| Variable | 3 | 1.6 |
| Baby | 1 | .5 |
| Other | 5 | 2.6 |
| Missing | 2 | 1.1 |

### 63 How Much Alike Are Partners

| | | |
|---|---|---|
| Don't know | 9 | 4.8 |
| Very much alike | 70 | 37.0 |
| Alike in some ways | 91 | 48.1 |
| Not at all alike | 17 | 9.0 |
| Other | 2 | 1.1 |

### 64 Differences Between Partners #1 / Differences Between Partners #2

| | Differences Between Partners #1 | | Differences Between Partners #2 | |
|---|---|---|---|---|
| | N | % | N | % |
| Physical | 2 | 1.1 | 1 | .5 |
| Basic habits | 9 | 4.8 | 8 | 4.2 |
| Everyday habits | 4 | 2.1 | 1 | .5 |
| Values | 28 | 14.8 | 8 | 4.2 |
| Interests | 23 | 12.2 | 6 | 3.2 |
| Attitude re: child | 3 | 1.6 | 1 | .5 |
| Money - neatness | 10 | 5.3 | 11 | 5.8 |
| Temperament | 82 | 43.4 | 25 | 13.2 |
| Other | 11 | 5.8 | 11 | 5.8 |
| Missing | 17 | 9.0 | 117 | 61.9 |

### 65 Mother Wants Baby To Be Like Which Partner

| | N | % |
|---|---|---|
| Don't know | 17 | 9.0 |
| Mother | 36 | 19.0 |
| Partner | 65 | 34.4 |
| Both | 67 | 35.4 |
| Neither | 4 | 2.1 |

### 66 Partners Agree Regarding Child Rearing

| | | |
|---|---|---|
| Very little | 3 | 1.6 |
| Moderate amount | 20 | 10.6 |
| Good bit | 73 | 38.6 |
| Great dial | 80 | 42.3 |
| Missing | 13 | 6.9 |

### 67 Feelings About Relationship With Partner

| | N | % |
|---|---|---|
| Satisfied | 157 | 83.1 |
| Relatively satisfied | 25 | 13.2 |
| Dissatisfied | 7 | 3.7 |

### 68 Mother's Physical Activity

| | | |
|---|---|---|
| High | 59 | 31.2 |
| Medium | 95 | 50.3 |
| Low | 35 | 18.5 |

### 69 Mother's Regularity - Sleeping/Eating

| | | |
|---|---|---|
| Fairly regular | 112 | 59.3 |
| Variable | 51 | 27.0 |
| Fairly irregular | 26 | 13.8 |

### 70 Mother's Initial Reactions - New Things

| | | |
|---|---|---|
| Accepting | 85 | 45.0 |
| Variable | 97 | 51.3 |
| Withdrawing | 5 | 2.6 |
| Missing | 2 | 1.1 |

### 71 Mother's Adaptability To Change

| | | |
|---|---|---|
| Adaptable | 102 | 54 |
| Variable | 68 | 36.0 |
| Slow to adapt | 19 | 10.1 |

### 72 Mother's Intensity Of Response

| | | |
|---|---|---|
| Intense | 66 | 34.9 |
| Variable | 77 | 40.7 |
| Mildly intense | 45 | 23.8 |
| Missing | 1 | .5 |

### 73 Mother's Distractibility

| | | |
|---|---|---|
| Easily distracted | 52 | 27.5 |
| Variable | 77 | 40.7 |
| Not easily distracted | 60 | 31.7 |

### 74 Mother's Sensitivity To Noise

| | | |
|---|---|---|
| Highly sensitive | 58 | 30.7 |
| Variable | 62 | 32.8 |
| Mildly sensitive | 69 | 36.5 |

### 75 Mother's Mood

| | | |
|---|---|---|
| Positive | 112 | 59.3 |
| Variable | 71 | 37.6 |
| Negative | 6 | 3.2 |

76 Mother's Persistence & Attention Span

| | N | % |
|---|---|---|
| Persistent | 95 | 50.3 |
| Variable | 78 | 41.3 |
| Not persistent | 13 | 6.9 |
| Missing | 3 | 1.6 |

77 Mother's First Concern / Mother's Second Concern / Mother's Third Concern

| | Mother's First Concern | | Mother's Second Concern | | Mother's Third Concern | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| None | 17 | 9.0 | 58 | 30.7 | 126 | 66.7 |
| Parent health | 16 | 8.5 | 9 | 4.8 | 2 | 1.1 |
| Child health | 34 | 18.0 | 18 | 9.5 | 0 | 0 |
| Child personality | 9 | 4.8 | 13 | 6.9 | 3 | 1.6 |
| Child rearing | 11 | 5.8 | 13 | 6.9 | 9 | 4.8 |
| Finances, job | 27 | 14.3 | 16 | 8.5 | 9 | 4.8 |
| Practical | 11 | 5.8 | 18 | 9.5 | 4 | 2.1 |
| Family relations | 12 | 6.3 | 20 | 10.6 | 11 | 5.8 |
| Parenthood | 31 | 16.4 | 10 | 5.3 | 7 | 3.7 |
| Other | 21 | 11.1 | 14 | 7.4 | 18 | 9.5 |

78 Partner's Primary Concerns: First / Second / Third

| | First | | Second | | Third | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| None | 25 | 13.2 | 91 | 48.1 | 147 | 77.8 |
| Parent health | 6 | 3.2 | 7 | 3.7 | 1 | .5 |
| Child health | 15 | 7.9 | 15 | 7.9 | 3 | 1.6 |
| Child personality | 4 | 2.1 | 7 | 3.7 | 1 | .5 |
| Child rearing | 3 | 1.6 | 3 | 1.6 | 5 | 2.6 |
| Finances, job | 87 | 46.0 | 20 | 10.6 | 8 | 4.2 |
| Practical | 9 | 4.8 | 17 | 9.0 | 2 | 1.1 |
| Family relations | 11 | 5.8 | 15 | 7.9 | 7 | 3.7 |
| Parenthood | 14 | 7.4 | 8 | 4.2 | 6 | 3.2 |
| Other | 15 | 7.9 | 6 | 3.2 | 9 | 4.8 |

79 Feelings Regarding Motherhood #1 / Feelings Regarding Motherhood #2

| | Feelings Regarding Motherhood #1 | | Feelings Regarding Motherhood #2 | |
|---|---|---|---|---|
| | N | % | N | % |
| Positive | 154 | 81.5 | 2 | 1.1 |
| Neutral | 9 | 4.8 | 1 | .5 |
| Ambivalent | 6 | 3.2 | 4 | 2.1 |
| Negative | 1 | .5 | 1 | .5 |
| Responsibility | 2 | 1.1 | 14 | 7.4 |
| Adjusting | 9 | 4.8 | 9 | 4.8 |
| Fulfilling | 1 | .5 | 14 | 7.4 |
| Other | 6 | 3.2 | 21 | 11.1 |
| Missing | 1 | .5 | 0 | 0 |
| Challenge | 0 | 0 | 4 | 2.1 |

80 Does Interview Describe Baby

| | N | % |
|---|---|---|
| Don't know | 13 | 6.9 |
| Yes | 174 | 92.1 |
| No | 2 | 1.1 |

Length Of Interview In Minutes

| | | |
|---|---|---|
| 20 | 4 | 2.1 |
| 25 | 19 | 10.1 |
| 28 | 1 | .5 |
| 30 | 46 | 24.3 |
| 32 | 1 | .5 |
| 34 | 1 | .5 |
| 35 | 17 | 9.0 |
| 40 | 20 | 10.6 |
| 45 | 11 | 5.8 |
| 50 | 3 | 1.6 |
| 60 | 3 | 1.6 |
| 70 | 2 | 1.1 |
| 80 | 4 | 2.1 |
| 85 | 1 | .5 |
| 88 | 1 | .5 |
| 90 | 1 | .5 |
| 99 | 3 | 1.6 |
| Missing | 51 | 27.0 |

## FOUR MONTH FREQUENCY DISTRIBUTION

Question

| 1 Change in Marital Status | N | % |
|---|---|---|
| None | 174 | 98.3 |
| Married | 1 | .6 |
| Divorced | 1 | .6 |
| Separated | 1 | .6 |

3 What Has Child Been Like? (3 responses)

| | N | % | N | % | N | % |
|---|---|---|---|---|---|---|
| Like other babies | 2 | 1.1 | -- | -- | -- | -- |
| Physical development | 26 | 14.7 | 12 | 6.8 | 3 | 1.7 |
| Positive temperament | 116 | 65.5 | 20 | 11.3 | 0 | 0 |
| Negative temperament | 9 | 5.1 | 8 | 4.5 | 1 | .6 |
| Health | 2 | 1.1 | 5 | 2.8 | 0 | 0 |
| Individuality | 11 | 6.2 | 45 | 25.4 | 18 | 10.2 |
| Dependency | 0 | 0 | 1 | .6 | 0 | 0 |
| Other | 7 | 4.0 | 7 | 4.0 | 3 | 1.7 |
| Missing | 4 | 2.3 | 79 | 44.6 | 150 | 84.7 |

4 Mother's Experience (3 responses)

| | N | % | N | % | N | % |
|---|---|---|---|---|---|---|
| Positive | 117 | 66.1 | 2 | 1.1 | 0 | 0 |
| Negative | 11 | 6.2 | 4 | 2.3 | 0 | 0 |
| Adjusting | 14 | 7.9 | 13 | 7.3 | 0 | 0 |
| Improving | 19 | 10.7 | 29 | 16.4 | 5 | 2.8 |
| Tiring | 1 | .6 | 5 | 2.8 | 0 | 0 |
| Tied Down | 2 | 1.1 | 6 | 3.4 | 0 | 0 |
| Other | 6 | 3.4 | 11 | 6.2 | 3 | 1.7 |
| Mom's health | 0 | 0 | 1 | .6 | 0 | 0 |
| Fulfilling | 0 | 0 | 6 | 3.4 | 3 | 1.7 |
| Missing | 7 | 4.0 | 100 | 56.4 | 166 | 93.8 |

| 5a Mother's Health Description | N | % |
|---|---|---|
| Excellent | 13 | 7.3 |
| Good | 112 | 63.3 |
| Fair | 7 | 4.0 |
| Poor | 5 | 2.8 |
| Better | 2 | 1.1 |
| Worse | 1 | .6 |
| No problems | 8 | 4.5 |
| Missing | 29 | 16.4 |

5b Mother's Health Problem (3 responses)

| | N | % | N | % | N | % |
|---|---|---|---|---|---|---|
| Viruses or allergies | 36 | 20.3 | 3 | 1.7 | 0 | 0 |
| Sleep problems | 21 | 11.9 | 4 | 2.3 | 0 | 0 |
| Hemorrhoids | 1 | .6 | 1 | .6 | 0 | 0 |
| G.U./Breast | 13 | 7.3 | 5 | 2.8 | 0 | 0 |
| Habit control | 4 | 2.3 | 0 | 0 | 0 | 0 |
| Neuro-Musculo-Skel. | 8 | 4.5 | 1 | .6 | 1 | .6 |
| Blood | 3 | 1.7 | 0 | 0 | 0 | 0 |
| Emotional | 2 | 1.1 | 2 | 1.1 | 2 | 1.1 |
| Other | 11 | 6.2 | 8 | 4.5 | 1 | .6 |
| Missing | 78 | 44.1 | 153 | 86.4 | 173 | 97.7 |

| 6 Mother Under Doctor's Care | N | % |
|---|---|---|
| Regular Checkups Only | 112 | 63.3 |
| Yes | 34 | 19.2 |
| No | 31 | 17.5 |

6 Why Mother Under Doctor's Care (2 responses)

| | N | % | N | % |
|---|---|---|---|---|
| Viruses or allergies | 10 | 5.6 | 0 | 0 |
| Sleep problems | 2 | 1.1 | 1 | .6 |
| Hemorrhoids | 2 | 1.1 | 0 | 0 |
| G.U./Breast | 13 | 7.3 | 3 | 1.7 |
| Habit control | 1 | .6 | 0 | 0 |
| Neuro-musculo | 7 | 4.0 | 0 | 0 |
| Emotional | 1 | .6 | 0 | 0 |
| Other | 7 | 4.0 | 2 | 1.1 |
| Missing | 134 | 75.7 | 171 | 96.6 |

| 7 Should Mother Be Under Doctor's Care | N | % |
|---|---|---|
| Yes | 12 | 6.8 |
| No | 72 | 40.7 |
| Missing | 93 | 52.5 |

7 Why Mother Should Be Under Doctor's Care

| | N | % |
|---|---|---|
| Viruses or allergies | 1 | .6 |
| Sleep problems | 2 | 1.1 |
| Hemorrhoids | 2 | 1.1 |
| Blood | 2 | 1.1 |
| Other | 3 | 1.7 |
| Missing | 167 | 94.4 |

| 8 Mother's Health Rating | N | % |
|---|---|---|
| Very good | 115 | 65.0 |
| Good | 50 | 28.0 |
| Fair | 11 | 6.2 |
| Missing | 1 | .6 |

| 9 Father Under Doctor's Care | N | % |
|---|---|---|
| Regular Checkups Only | 52 | 29.4 |
| Yes | 24 | 13.6 |
| No | 90 | 50.8 |
| Don't know | 2 | 1.1 |
| Missing | 9 | 5.1 |

| 9 Why Father Under Doctor's Care | N | % |
|---|---|---|
| Viruses or allergies | 4 | 2.3 |
| Sleep problems | 1 | .6 |
| Hemorrhoids | 1 | .6 |
| G.U./Breast | 2 | 1.1 |
| Neuro-Musculo-Skel. | 6 | 3.4 |
| Blood | 2 | 1.1 |
| Emotional | 1 | .6 |
| Other | 9 | 5.1 |
| Missing | 151 | 85.3 |

| 10 Should Father Be Under Doctor's Care | N | % |
|---|---|---|
| Yes | 24 | 13.6 |
| No | 101 | 57.1 |
| Missing | 52 | 29.4 |

10 Why Should Father Be Under Doctor's Care

| | N | % |
|---|---|---|
| Viruses or allergies | 7 | 4 |
| Sleep problems | 2 | 1.1 |
| Neuro-Musculo-Skel. | 2 | 1.1 |
| Emotional | 1 | .6 |
| Other | 7 | 4.0 |
| Missing | 158 | 89.3 |

11 Father's Health Rating

| | | |
|---|---|---|
| Very good | 123 | 69.5 |
| Good | 39 | 22.0 |
| Fair | 5 | 2.8 |
| Poor | 2 | 1.1 |

12 Child Under Doctor's Care

| | | |
|---|---|---|
| Regular checkups only | 164 | 92.7 |
| Yes | 10 | 5.6 |
| No | 1 | .6 |
| Missing | 2 | 1.1 |

12 Why Child Under Doctor's Care

| | | |
|---|---|---|
| Viruses or allergies | 5 | 2.8 |
| Sleep problems | 2 | 1.1 |
| Other | 11 | 6.2 |
| Missing | 159 | 89.8 |

14 Child's Health Rating

| | N | % |
|---|---|---|
| Very good | 148 | 83.6 |
| Good | 26 | 14.7 |
| Fair | 2 | 1.1 |
| Poor | 1 | .6 |

27 Child Primary Caregiver

| | | |
|---|---|---|
| Mom | 168 | 94.9 |
| Dad | 2 | 1.1 |
| Other | 7 | 4.0 |

28 Amount Husband Involved in Caregiving

| | | |
|---|---|---|
| None | 6 | 3.4 |
| Very little | 28 | 15.8 |
| Moderate | 76 | 42.9 |
| Good bit | 33 | 18.6 |
| Great deal | 26 | 14.7 |
| Missing | 8 | 4.5 |

29 Satisfaction with Husband's Care

| | | |
|---|---|---|
| Yes | 143 | 80.8 |
| No | 23 | 13.0 |
| Missing | 11 | 6.2 |

29 Why Not Satisfied with Husband's Care

| | | |
|---|---|---|
| More than needed | 1 | .6 |
| As much as he can | 1 | .6 |
| Not consistent | 1 | .6 |
| Missing | 174 | 98.3 |

30 Specific Father Caretaking Activities

| | | | |
|---|---|---|---|
| Diapers | No | 33 | 18.6 |
| | Yes | 144 | 81.4 |
| Feeds | No | 48 | 27.1 |
| | Yes | 129 | 72.9 |

30 Father Caretaking (cont'd)

| | | N | % |
|---|---|---|---|
| Bathes | No | 101 | 57.1 |
| | Yes | 76 | 42.9 |
| Plays | No | 16 | 9.0 |
| | Yes | 161 | 91.0 |
| Soothes | No | 48 | 27.1 |
| | Yes | 129 | 72.9 |
| Nothing | No | 170 | 96.0 |
| | Yes | 7 | 4.0 |
| Stimulates | No | 126 | 71.2 |
| | Yes | 51 | 28.8 |
| Caretaking | No | 164 | 92.7 |
| | Yes | 13 | 7.3 |
| House Chores | No | 174 | 98.3 |
| | Yes | 3 | 1.7 |

31 Father Teaching (2 responses)

| | N | % | N | % |
|---|---|---|---|---|
| Doesn't teach | 21 | 11.9 | 0 | 0 |
| Eye skills | 15 | 8.5 | 1 | .6 |
| Grasping | 40 | 22.6 | 7 | 4.0 |
| Language | 46 | 26.0 | 12 | 6.8 |
| Eating | 3 | 1.7 | 4 | 2.3 |
| Motor Development | 32 | 18.1 | 35 | 19.8 |
| Playing with toys - games | 5 | 2.8 | 18 | 10.2 |
| Social development | 11 | 6.2 | 15 | 8.5 |
| Other | 3 | 1.7 | 4 | 2.3 |
| Missing | 1 | .6 | 81 | 45.8 |

32 Amount of Time Father Spends With Child

| | N | % |
|---|---|---|
| Less 15 minutes | 7 | 4.0 |
| 15 - 60 minutes | 27 | 15.3 |
| 1 - 2 hours | 49 | 27.7 |
| 2 - 3 hours | 39 | 22.0 |
| More 3 hours | 39 | 22.0 |

33 Mother's Activity with Child (3 responses)

| | N | % | N | % | N | % |
|---|---|---|---|---|---|---|
| Rocking - singing | 34 | 19.2 | 4 | 2.3 | 0 | 0 |
| Talk | 57 | 32.2 | 12 | 6.8 | 2 | 1.1 |
| Visual Play | 6 | 3.4 | 5 | 2.8 | 1 | .6 |
| Motor Play | 31 | 17.5 | 19 | 10.7 | 7 | 4.0 |
| Unspecified play | 30 | 16.9 | 38 | 21.5 | 6 | 3.4 |
| In mom's activity | 4 | 2.3 | 7 | 4.0 | 3 | 1.7 |
| Hold | 14 | 7.9 | 27 | 15.3 | 13 | 7.3 |
| Other | 1 | .6 | 12 | 6.8 | 5 | 2.8 |
| Missing | 0 | 0 | 44 | 24.9 | 134 | 75.7 |
| Social play | 0 | 0 | 9 | 5.1 | 6 | 3.4 |

33 Time Spent in Activity

| | N | % |
|---|---|---|
| Less than 15 minutes | 42 | 23.7 |
| 15 - 29 minutes | 39 | 22.0 |
| 30 - 44 minutes | 37 | 20.9 |
| 45 - 59 minutes | 20 | 11.3 |
| 1 - 2 hours | 25 | 14.1 |
| 2 - 3 hours | 6 | 3.4 |
| More than 3 hours | 5 | 2.8 |
| Other | 1 | .6 |
| Missing | 2 | 1.1 |

33 Mother's Activity Times/Day

| | | |
|---|---|---|
| One | 2 | 1.1 |
| Two | 17 | 9.6 |
| Three | 25 | 14.1 |
| Four | 34 | 19.2 |
| Five | 23 | 13.0 |
| Six | 30 | 16.9 |
| Seven | 8 | 4.5 |
| Eight | 7 | 4.0 |
| Nine | 2 | 1.1 |
| Ten | 7 | 4.0 |
| Eleven | 5 | 2.8 |
| Twelve | 1 | .6 |
| Fifteen | 3 | 1.7 |
| Eighteen | 1 | .6 |
| Twenty | 2 | 1.1 |
| Twenty-four | 1 | .6 |
| Missing | 9 | 5.1 |

34 Does Child Need More Time When Mother Busy

| | | |
|---|---|---|
| Yes | 57 | 32.2 |
| No | 99 | 55.9 |
| Variable | 21 | 11.9 |

34 How Mother Handles

| | | |
|---|---|---|
| Carry | 16 | 9 |
| Let cry | 5 | 2.8 |
| Play | 4 | 2.3 |
| Talk | 5 | 2.8 |
| Place in view | 21 | 11.9 |
| Place out " | 4 | 2.3 |
| Plan work around | 8 | 4.5 |
| Other | 18 | 10.2 |
| Missing | 96 | 54.2 |

### 35 Mother's Teaching Activity (3 responses)

| | N | % | N | % | N | % |
|---|---|---|---|---|---|---|
| Doesn't teach | 4 | 2.3 | -- | -- | -- | -- |
| Eye skills | 13 | 7.3 | 1 | .6 | -- | -- |
| Grasping | 60 | 33.9 | 12 | 6.8 | 5 | 2.8 |
| Language | 38 | 21.5 | 15 | 8.5 | 8 | 4.5 |
| Eating | 10 | 5.6 | 5 | 2.8 | 2 | 1.1 |
| Motor development | 28 | 15.8 | 63 | 35.6 | 10 | 5.6 |
| Play with toys - games | 11 | 6.2 | 13 | 7.3 | 10 | 5.6 |
| Social development | 10 | 5.6 | 10 | 5.6 | 9 | 5.1 |
| Other | 3 | 1.7 | 9 | 5.1 | 1 | .6 |
| Missing | 0 | 0 | 49 | 27.7 | 132 | 74.6 |

### 41 Nature of Sleep Concern

| | N | % |
|---|---|---|
| Disruption in sleep | 2 | 1.1 |
| Not getting enough | 7 | 4.0 |
| Short sleep segments | 4 | 2.3 |
| Restlessness | 1 | .6 |
| Lack of schedule | 4 | 2.3 |
| Doesn't sleep → night | 4 | 2.3 |
| Evening bedtime late | 2 | 1.1 |
| Other | 7 | 4.0 |
| Missing | 146 | 82.5 |

### Rating Overall Rhythmicity

| | | |
|---|---|---|
| Regular | 48 | 27.1 |
| Variable | 120 | 67.8 |
| Irregular | 9 | 5.1 |

### Rate Approach

| | N | % |
|---|---|---|
| Accepting | 155 | 87.6 |
| Variable | 20 | 11.3 |
| Withdrawing | 2 | 1.1 |

### 50 Rate Overall Adaptability

| | N | % |
|---|---|---|
| Adaptable | 146 | 82.5 |
| Variable | 28 | 15.8 |
| Slow | 3 | 1.7 |

### 51 Rate Intensity

| | | |
|---|---|---|
| Intense | 77 | 43.5 |
| Variable | 81 | 45.8 |
| Quiet | 19 | 10.7 |

### 53 Rate Overall Distractibility

| | | |
|---|---|---|
| Easily | 66 | 37.3 |
| Variable | 88 | 49.7 |
| Not easily | 23 | 13.0 |

### 55 Threshold Rating

| | | |
|---|---|---|
| Very sensitive | 31 | 17.5 |
| Moderately sensitive | 101 | 57.1 |
| Mildly sensitive | 44 | 24.9 |
| Missing | 1 | .6 |

### 58 Rate Mood

| | | |
|---|---|---|
| Happy | 157 | 88.7 |
| Variable | 20 | 11.3 |

### 59 Rate Persistence

| | | |
|---|---|---|
| Long time | 51 | 28.8 |
| Variable | 106 | 59.9 |
| Momentarily | 20 | 11.3 |

### 61 Feelings Re: Motherhood (2 responses)

| | N | % | N | % |
|---|---|---|---|---|
| Positive | 163 | 92.1 | 1 | .6 |
| Neutral | 3 | 1.7 | 0 | 0 |
| Ambivalent | 7 | 4.0 | 4 | 2.3 |
| Negative | 2 | 1.1 | 2 | 1.1 |
| Other | 2 | 1.1 | 9 | 5.1 |
| Responsibility | -- | -- | 8 | 4.5 |
| Challenge | -- | -- | 7 | 4.0 |
| Adjusting | -- | -- | 11 | 6.0 |
| Fulfilling | -- | -- | 9 | 5.1 |
| Missing | -- | -- | 126 | 71.2 |

### 62 Motherhood Meets Expectations

| | N | % |
|---|---|---|
| Yes | 105 | 59.3 |
| No | 64 | 36.2 |
| Missing | 8 | 4.5 |

### 62 Comments Re: Expectations

| | N | % |
|---|---|---|
| No expectations | 22 | 12.4 |
| Comes naturally | 2 | 1.1 |
| Better | 64 | 36.2 |
| Worse | 8 | 4.5 |
| Demanding | 11 | 6.2 |
| Experience Helps | 1 | .6 |
| Like babies | 2 | 1.1 |
| Responsibility | 2 | 1.1 |
| Other | 10 | 5.6 |
| Missing | 55 | 31.1 |

### 63 Mother's Primary Concerns (3 responses)

| | N | % | N | % | N | % |
|---|---|---|---|---|---|---|
| Parents' health | 11 | 6.2 | 0 | 0 | 2 | 1.1 |
| Child's health | 27 | 15.3 | 8 | 4.5 | 1 | .6 |
| Rearing - char. | 8 | 4.5 | 11 | 6.2 | 1 | .6 |
| Rearing - phy. | 7 | 4.0 | 6 | 3.4 | 4 | 2.3 |
| Finances | 24 | 13.6 | 14 | 7.9 | 4 | 2.3 |
| Practical | 26 | 14.7 | 12 | 6.8 | -- | -- |
| Family relations | 10 | 5.6 | 8 | 4.5 | 2 | 1.1 |
| Parenthood | 35 | 19.8 | 15 | 8.5 | 1 | .6 |
| Other | 15 | 8.5 | 5 | 2.8 | 2 | 1.1 |
| Missing | 14 | 7.9 | 98 | 55.4 | 160 | 90.4 |

### 64 Father's Primary Concerns (3 responses)

| | | | | | | |
|---|---|---|---|---|---|---|
| Parents' health | 7 | 4.0 | 4 | 2.3 | 1 | .6 |
| Child's health | 10 | 5.6 | 8 | 4.5 | -- | -- |
| Rearing - char. | 7 | 4.0 | 1 | .6 | 1 | .6 |
| Rearing - phy. | 2 | 1.1 | 2 | 1.1 | -- | -- |
| Finances | 76 | 42.9 | 20 | 11.3 | 2 | 1.1 |
| Practical | 15 | 8.5 | 17 | 9.6 | 2 | 1.1 |
| Family relations | 9 | 5.1 | 5 | 2.8 | 4 | 2.3 |
| Parenthood | 19 | 10.7 | 7 | 4.0 | 1 | .6 |
| Other | 10 | 5.6 | 2 | 1.1 | -- | -- |
| Missing | 22 | 12.4 | 111 | 62.7 | 166 | 93.8 |

### Length Minutes

5 - 190 minutes

| | |
|---|---|
| Mean = 38" | Median = 31.6" |
| Missing 65 | 36.7% |

EIGHT MONTH FREQUENCY DISTR BUTION

Question

| 1 | Change in Marital Status | N | % |
|---|---|---|---|
| | No Change | 158 | 97.5 |
| | Married | 1 | .6 |
| | Divorced | 1 | .6 |
| | Separated | 1 | .6 |
| | Back together | 1 | .6 |

| 3 | Baby Description | N | % | N | % | N | % |
|---|---|---|---|---|---|---|---|
| | Physical development | 47 | 29 | 19 | 11.7 | 4 | 2.5 |
| | Positive temperament | 88 | 54.3 | 26 | 16 | 4 | 2.5 |
| | Negative temperament | 6 | 3.7 | 13 | 8 | 4 | 2.5 |
| | Dependency | 1 | .6 | 1 | .6 | 1 | .6 |
| | Individuality | 16 | 9.9 | 43 | 26.5 | 23 | 14.2 |
| | Other | -- | -- | 4 | 2.5 | 4 | 2.5 |
| | Missing | 4 | 2.5 | 56 | 34.6 | 122 | 75.[illegible] |

| 4 | Mother's Experience | N | % | N | % | N | % |
|---|---|---|---|---|---|---|---|
| | Positive feeling | 120 | 74.1 | 4 | 2.5 | 0 | 0 |
| | Negative feeling | 16 | 9.9 | 7 | 4.3 | 0 | 0 |
| | Adjusting | 2 | 1.2 | 3 | 1.9 | 2 | 1.2 |
| | Improving | 6 | 1.7 | 32 | 19.8 | 0 | 0 |
| | Tiring | 8 | 4.9 | 8 | 4.9 | 0 | 0 |
| | Other | 6 | 3.7 | 17 | 10.5 | 2 | 1.2 |
| | Missing | 4 | 2.5 | 90 | 55.6 | 158 | 97.5 |
| | Fulfilling | 0 | 0 | 1 | .6 | 0 | 0 |

| 5 | Mother's Health Description | N | % |
|---|---|---|---|
| | Excellent | 18 | 11.1 |
| | Good | 113 | 69.8 |
| | Fair | 2 | 1.2 |
| | Poor | 5 | 3.1 |
| | No problems | 2 | 1.2 |
| | Missing | 22 | 13.6 |

| 5b | Mother's Health Problem (3 responses) | N | % | N | % | N | % |
|---|---|---|---|---|---|---|---|
| | Viruses or allergies | 47 | 29 | 0 | 0 | 0 | 0 |
| | Sleep problems | 4 | 2.5 | 3 | 1.9 | 0 | 0 |
| | G.U. - Breast | 2 | 1.2 | 2 | 1.2 | 0 | 0 |
| | Habit control | 3 | 1.9 | 0 | 0 | 0 | 0 |
| | Neuro-Musculo-Skel. | 2 | 1.2 | 0 | 0 | 0 | 0 |
| | Blood | 1 | .5 | 1 | .6 | 0 | 0 |
| | Emotional | 2 | 1.2 | 1 | .6 | 1 | .6 |
| | Other | 15 | 9.3 | 3 | 1.9 | 1 | .6 |
| | Missing | 86 | 53 | 159 | 93.8 | 160 | 98.8 |

| 6 | Mother Under Doctor's Care | N | % |
|---|---|---|---|
| | Regular checkups only | 51 | 31.5 |
| | Yes | 48 | 29.6 |
| | No | 61 | 37.7 |
| | Missing | 2 | 1.2 |

| | Why Mother Under Doctor's Care (2 responses) | N | % | N | % |
|---|---|---|---|---|---|
| | Viruses or allergies | 10 | 6.2 | 0 | 0 |
| | Hemorrhoids | 1 | .6 | 0 | 0 |
| | G.U. - Breast | 5 | 3.1 | 1 | .6 |
| | Neuro-Musculo-Skel. | 4 | 2.5 | 0 | 0 |
| | Blood | 1 | .6 | 1 | .6 |
| | Emotional | 2 | 1.2 | 1 | .6 |
| | Other | 20 | 12.3 | 0 | 0 |
| | Missing | 119 | 73.5 | 159 | 98.1 |

| 7 | Should Mother Be Under Doctor's Care | N | % |
|---|---|---|---|
| | Yes | 13 | 8.0 |
| | No | 97 | 59.9 |
| | Missing | 52 | 32.1 |

| 8 | Mother's Health Rating | N | % |
|---|---|---|---|
| | Very good | 102 | 63.0 |
| | Good | 45 | 27.8 |
| | Fair | 11 | 6.8 |
| | Poor | 2 | 1.2 |
| | Missing | 2 | 1.2 |

| 9 | Father Under Doctor's Care | N | % |
|---|---|---|---|
| | Regular checkups only | 36 | 22.2 |
| | Yes | 33 | 20.4 |
| | No | 86 | 53.1 |
| | Don't know | 1 | .6 |
| | Missing | 6 | 3.7 |

| 9b | Why Father Under Doctor's Care | N | % |
|---|---|---|---|
| | Viruses or allergies | 7 | 4.3 |
| | Neuro-Musc.-Skel. | 2 | 1.2 |
| | Blood | 2 | 1.2 |
| | Emotional | 1 | .6 |
| | Other | 8 | 4.9 |
| | Missing | 142 | 87.7 |

| | Should Father Be Under Doctor's Care | N | % |
|---|---|---|---|
| | Yes | 15 | 9.3 |
| | No | 106 | 65.4 |
| | Don't know | 2 | 1.2 |
| | Missing | 39 | 24.1 |

| 10 | Why Should Father Be Under Doctor's Care | N | % |
|---|---|---|---|
| | Hemorrhoids | 1 | .6 |
| | Habit control | 1 | .6 |
| | Emotional | 1 | .6 |
| | Other | 4 | 2.5 |
| | Missing | 155 | 95.7 |

| 11 | Father's Health Rating | N | % |
|---|---|---|---|
| | Very good | 112 | 69.1 |
| | Good | 40 | 24.7 |
| | Fair | 3 | 1.9 |
| | Poor | 1 | .6 |
| | Missing | 6 | 3.7 |

| 12 | Child Under Doctor's Care | N | % |
|---|---|---|---|
| | Regular checkups only | 137 | 84.6 |
| | Yes | 20 | 12.3 |
| | No | 2 | 1.2 |
| | Missing | 3 | 1.9 |

| 12 b | Why Child Under Doctor's Care | N | % |
|---|---|---|---|
| | Viruses or allergies | 9 | 5.6 |
| | Neuro-Musc.-Skel. | 1 | .6 |
| | Other | 6 | 3.7 |
| | Missing | 146 | 90.1 |

| 14 | Child Health Rating | N | % |
|---|---|---|---|
| | Very good | 122 | 75.3 |
| | Good | 34 | 21.0 |
| | Fair | 2 | 1.2 |
| | Missing | 4 | 2.5 |

### 27 Child's Primary Caregiver

| | N | % |
|---|---|---|
| Mom | 150 | 92.6 |
| Dad | 1 | .6 |
| Other | 10 | 6.2 |
| Missing | 1 | .6 |

### 28 Amount Husband Involved In Caregiving

| | N | % |
|---|---|---|
| None | 4 | 2.5 |
| Very little | 28 | 17.3 |
| Moderate amount | 65 | 40.1 |
| Good bit | 38 | 23.5 |
| Great deal | 24 | 14.8 |
| Missing | 3 | 1.9 |

### 29 Satisfaction With Husband's Care

| | N | % |
|---|---|---|
| Yes | 135 | 83.3 |
| No | 24 | 14.8 |
| Missing | 3 | 1.9 |

### 29b Why Not Satisfied With Husband's Care

| | N | % |
|---|---|---|
| More than needed | 1 | .6 |
| Not consistent | 1 | .6 |
| Other | 4 | 2.5 |
| Missing | 156 | 96.3 |

### 30 Father Diapers

| | N | % |
|---|---|---|
| No | 31 | 19.1 |
| Yes | 131 | 80.9 |

### Father Feeds

| | N | % |
|---|---|---|
| No | 27 | 16.7 |
| Yes | 135 | 83.3 |

### Father Bathes

| | N | % |
|---|---|---|
| No | 77 | 47.5 |
| Yes | 85 | 52.5 |

### Father Plays

| | N | % |
|---|---|---|
| No | 5 | 3.1 |
| Yes | 157 | 96.9 |

### Father Soothes

| | N | % |
|---|---|---|
| No | 37 | 22.8 |
| Yes | 125 | 77.2 |

### Father Does Nothing

| | N | % |
|---|---|---|
| No | 157 | 96.9 |
| Yes | 5 | 3.1 |

### Father Stimulates

| | N | % |
|---|---|---|
| No | 88 | 54.3 |
| Yes | 74 | 45.7 |

### Father Does Caretaking

| | N | % |
|---|---|---|
| No | 154 | 95.1 |
| Yes | 8 | 4.9 |

### Father Does House Chores

| | N | % |
|---|---|---|
| No | 161 | 99.4 |
| Yes | 1 | .6 |

### 31 Father Teaching Activity (2 responses)

| | N | % | N | % |
|---|---|---|---|---|
| Doesn't teach | 13 | 8.0 | 0 | 0 |
| Eye skills | 2 | 1.2 | 1 | .6 |
| Grasping | 1 | .6 | 2 | 1.2 |
| Language | 48 | 29.6 | 14 | 8.6 |
| Eating | 8 | 4.9 | 6 | 3.7 |
| Motor Development | 57 | 35.2 | 17 | 10.5 |
| Playing with toys/ games | 3 | 1.9 | 5 | 3.1 |
| Social development | 27 | 16.7 | 26 | 16.0 |
| Other | 1 | .6 | 3 | 1.9 |
| Missing | 2 | 1.2 | 88 | 54.3 |

### 32 Amount of Time Father Spends w/ Child

| | N | % |
|---|---|---|
| None | 2 | 1.2 |
| Don't know | 1 | .6 |
| Less than 15 min. | 5 | 3.1 |
| 15 - 60 min. | 17 | 10.5 |
| 1 - 2 hours | 43 | 26.5 |
| 2 - 3 hours | 44 | 27.2 |
| More than 3 hours | 46 | 28.4 |
| Missing | 4 | 2.5 |

### 33 Mother's Activity (3 responses)

| | N | % | N | % | N | % |
|---|---|---|---|---|---|---|
| Rocking-singing | 28 | 17.3 | 7 | 4.3 | 0 | 0 |
| Talking | 23 | 14.2 | 8 | 4.9 | 1 | .6 |
| Visual play | 2 | 1.2 | 2 | 1.2 | 1 | .6 |
| Motor play | 17 | 10.5 | 11 | 6.8 | 2 | 1.2 |
| Social play | 22 | 13.6 | 13 | 8.0 | 3 | 1.9 |
| Unspecified play | 58 | 35.8 | 40 | 24.7 | 6 | 3.7 |
| In mother's activity | 2 | 1.2 | 0 | 0 | 1 | .6 |
| Hold | 6 | 3.7 | 9 | 5.6 | 2 | 1.2 |
| Other | 4 | 2.5 | 5 | 3.1 | 3 | 1.9 |
| Missing | 0 | 0 | 67 | 41.4 | 143 | 88.3 |

### 33 Time Spent In Activity

| | N | % |
|---|---|---|
| Less than 15 min. | 52 | 32.1 |
| 15 - 29 min. | 35 | 21.6 |
| 30 - 44 min. | 24 | 14.8 |
| 45 - 59 min. | 13 | 8.0 |
| 1 - 2 hours | 19 | 11.7 |
| 2 - 3 hours | 10 | 6.2 |
| More than 3 hours | 6 | 3.7 |
| Other | 3 | 1.9 |

### 33 Mother's Activity Times per Day

| | N | % |
|---|---|---|
| One | 11 | 6.8 |
| Two | 14 | 8.6 |
| Three | 25 | 15.4 |
| Four | 29 | 17.9 |
| Five | 16 | 9.9 |
| Six | 16 | 9.9 |
| Seven | 17 | 10.5 |
| Eight | 7 | 4.3 |
| Nine | 2 | 1.2 |
| Ten | 6 | 3.7 |
| Eleven | 3 | 1.9 |
| Twelve | 1 | .6 |
| Thirteen | 1 | .6 |
| Fourteen | 1 | .6 |
| Sixteen | 1 | .6 |
| Twenty | 4 | 2.5 |
| Twenty-four | 1 | .6 |
| Forty | 1 | .6 |
| Missing | 6 | 3.7 |

### 34 Does Child Need More Time When Mother Busy

| | N | % |
|---|---|---|
| Yes | 54 | 33.3 |
| No | 77 | 47.5 |
| Variable | 30 | 18.5 |
| Missing | 1 | .6 |

### 34b How Mother Handles

| | N | % |
|---|---|---|
| Carry | 18 | 11.1 |
| Ignores | 7 | 4.3 |
| Let cry | 3 | 1.9 |
| Play | 7 | 4.3 |
| Talk | 1 | .6 |
| Place in view | 12 | 7.4 |
| Place out of view | 3 | 1.9 |
| Plan work around | 3 | 1.9 |
| Other | 33 | 20.4 |
| Missing | 75 | 46.3 |

35 Mother Teaching Activity (3 responses)

| | N | % | N | % | N | % |
|---|---|---|---|---|---|---|
| Doesn't teach | 7 | 4.3 | 0 | 0 | 1 | .6 |
| Grasping | 3 | 1.9 | 2 | 1.2 | 1 | .6 |
| Language | 61 | 37.7 | 8 | 4.9 | 5 | 3.1 |
| Easting | 26 | 16.0 | 28 | 17.3 | 2 | 1.2 |
| Motor development | 33 | 20.4 | 32 | 19.8 | 2 | 1.2 |
| Playing with toys/games | 4 | 2.5 | 11 | 6.8 | 7 | 4.3 |
| Social development | 26 | 16.0 | 22 | 13.6 | 14 | 8.6 |
| Other | 2 | 1.2 | 2 | 1.2 | 2 | 1.1 |
| Eye skills | 0 | 0 | 3 | 1.9 | 0 | 0 |
| Missing | 0 | 0 | 54 | 33.3 | 128 | 79.0 |

36 Influence in Child's Life

| | N | % |
|---|---|---|
| Mom | 74 | 45.7 |
| Dad | 7 | 4.3 |
| Both parents | 44 | 27.2 |
| Relatives | 3 | 1.9 |
| Other people | 4 | 2.5 |
| People in general | 9 | 5.6 |
| Extended family | 2 | 1.2 |
| Other | 12 | 7.4 |
| Missing | 7 | 4.3 |

36b Characteristic of Influence

| | N | % | N | % |
|---|---|---|---|---|
| Love | 17 | 10.5 | 1 | .6 |
| Consistence | 5 | 3.1 | 1 | .6 |
| Attention-time | 59 | 36.4 | 3 | 1.9 |
| Security | 9 | 5.6 | 2 | 1.2 |
| Inanimate stimulation | 4 | 2.5 | 0 | 0 |
| Animate stimulation | 16 | 9.9 | 8 | 4.9 |
| Caretaking | 6 | 3.7 | 5 | 3.1 |
| Positive attitude | 16 | 9.9 | 6 | 3.7 |
| Other | 21 | 13.0 | 3 | 1.9 |
| Missing | 9 | 5.6 | 133 | 82.1 |

39 Rate Activity

| | N | % |
|---|---|---|
| Highly active | 100 | 61.7 |
| Moderately active | 61 | 37.7 |
| Mildly active | 1 | .6 |

41 Sleep Concern

| | N | % |
|---|---|---|
| Yes | 54 | 33.3 |
| No | 108 | 66.7 |

41a Nature of Sleep Concern

| | N | % |
|---|---|---|
| Disruption in sleep | 1 | .6 |
| Not getting enough | 9 | 5.6 |
| Short sleep segments | 3 | 1.9 |
| Restlessness | 4 | 2.5 |
| Lack of schedule | 3 | 1.9 |
| Doesn't sleep through night | 5 | 3.1 |
| Evening bedtime late | 3 | 1.9 |
| Other | 1 | .6 |
| Missing | 133 | 82.1 |

42 Rate Overall Rhythmicity

| | N | % |
|---|---|---|
| Regular | 40 | 24.7 |
| Variable | 115 | 71.0 |
| Irregular | 7 | 4.3 |

46 Rate Approach

| | N | % |
|---|---|---|
| Accepting | 147 | 90.7 |
| Variable | 15 | 9.3 |

50 Rate Overall Adaptability

| | N | % |
|---|---|---|
| Adaptable | 131 | 80.9 |
| Variable | 26 | 16.0 |
| Slow to adapt | 3 | 1.9 |
| Missing | 2 | 1.2 |

51 Rate Intensity

| | N | % |
|---|---|---|
| Intense | 71 | 43.8 |
| Variable | 81 | 50.0 |
| Quiet | 10 | 6.2 |

55 Threshold Rating

| | N | % |
|---|---|---|
| Very sensitive | 45 | 27.8 |
| Moderately sensitive | 84 | 51.9 |
| Mildly sensitive | 31 | 19.1 |
| Missing | 2 | 1.2 |

58 Rate Mood

| | N | % |
|---|---|---|
| Happy | 144 | 88.9 |
| Variable | 17 | 10.5 |
| Missing | 1 | .6 |

59 Rate Persistence

| | N | % |
|---|---|---|
| Long time | 46 | 28.4 |
| Variable | 102 | 63.0 |
| Momentarily | 14 | 8.6 |

61 Feelings Re Motherhood (2 responses)

| | N | % | N | % |
|---|---|---|---|---|
| Positive | 144 | 88.9 | 0 | 0 |
| Neutral | 5 | 3.1 | 0 | 0 |
| Ambivalent | 8 | 4.9 | 2 | 1.2 |
| Negative | 1 | .6 | 2 | 1.2 |
| Adjusting | 1 | .6 | 3 | 1.9 |
| Other | 1 | .6 | 12 | 7.4 |
| Missing | 2 | 1.2 | 116 | 71.6 |
| Fulfilling | 0 | 0 | 20 | 12.3 |
| Challenging | 0 | 0 | 4 | 2.5 |
| Responsibility | 0 | 0 | 3 | 1.9 |

62 Motherhood Meets Expectations

| | N | % |
|---|---|---|
| Yes | 85 | 52.5 |
| No | 60 | 37.0 |
| Missing | 17 | 10.5 |

Comments Re Expectations

| | N | % |
|---|---|---|
| No expectations | 15 | 9.3 |
| Better | 51 | 31.5 |
| Worse | 11 | 6.8 |
| Demanding | 7 | 4.3 |
| Experience helps | 5 | 3.1 |
| Like babies | 3 | 1.9 |
| Responsibility | 1 | .6 |
| Other | 19 | 11.7 |
| Missing | 50 | 30.9 |

63 Mother's Primary Concern (3 responses)

| | N | % | N | % | N | % |
|---|---|---|---|---|---|---|
| Parents' health | 4 | 2.5 | 1 | .6 | 1 | .6 |
| Child's health | 26 | 16.0 | 4 | 2.5 | 0 | 0 |
| Rearing Character | 6 | 3.7 | 4 | 2.5 | 2 | 1.2 |
| Rearing Physical | 5 | 3.1 | 3 | 1.9 | 0 | 0 |
| Finances | 38 | 23.5 | 8 | 4.9 | 1 | .6 |
| Practical | 22 | 13.6 | 14 | 8.6 | 1 | .6 |
| Family relations | 6 | 3.7 | 11 | 6.8 | 2 | 1.2 |
| Parenthood | 26 | 16.0 | 9 | 5.6 | 5 | 3.1 |
| Other | 10 | 6.2 | 4 | 2.5 | 2 | 1.2 |
| Missing | 19 | 11.7 | 104 | 64.1 | 148 | 91.4 |

64 Father's Primary Concern (3 responses)

| | | | | | | |
|---|---|---|---|---|---|---|
| Parents' health | 4 | 2.5 | 1 | .6 | -- | -- |
| Child's health | 10 | 6.2 | 7 | 4.3 | 1 | .6 |
| Rearing character | 8 | 4.9 | 2 | 1.2 | 1 | .6 |
| Rearing physical | 2 | 1.2 | 0 | 0 | 0 | 0 |
| Finances | 76 | 46.9 | 9 | 5.6 | 0 | 0 |
| Practical | 18 | 11.1 | 16 | 9.9 | 0 | 0 |
| Family relations | 3 | 1.9 | 5 | 3.1 | 0 | 0 |
| Parenthood | 10 | 6.2 | 4 | 2.5 | 7 | 4.3 |
| Other | 7 | 4.3 | 3 | 1.9 | 4 | 2.5 |
| Missing | 24 | 14.8 | 115 | 71.0 | 149 | 92.0 |

Length Minutes of Interview

| | N | % | | N | % |
|---|---|---|---|---|---|
| Fifteen minutes | 1 | .6 | Fifty | 2 | 1.2 |
| Twenty | 3 | 1.9 | Fifty-five | 4 | 2.5 |
| Twenty-five | 8 | 4.9 | Sixty | 1 | .6 |
| Thirty | 26 | 16.0 | Ninety | 4 | 2.5 |
| Thirty-five | 16 | 9.9 | One Hundred | 1 | .6 |
| Forty | 12 | 7.4 | One Hundred-Five | 1 | .6 |
| Forty-five | 11 | 6.8 | One Hundred-Twenty | 3 | 1.9 |
| | | | Missing | 69 | 42.6 |

## TWELVE MONTH INTERVIEW
## FREQUENCY DISTRIBUTIONS

QUESTION

### 1 CHANGE IN MARITAL STATUS (Since 8 month visit)

| | N | % |
|---|---|---|
| No Change | 172 | 89.1 |
| Married | 1 | .5 |
| Divorced | 1 | .5 |
| Separated | 3 | 1.6 |
| Missing | 16 | 8.3 |

### 3 INCOME PAST 12 MONTHS

| | N | % |
|---|---|---|
| 2 - 3,000 | 11 | 5.7 |
| 3 - 4,000 | 5 | 2.6 |
| 4 - 5,000 | 2 | 1.0 |
| 5 - 6,000 | 5 | 2.6 |
| 6 - 7,000 | 5 | 2.6 |
| 7 - 8,000 | 4 | 2.1 |
| 8 - 9,000 | 15 | 7.8 |
| 9 - 10,000 | 13 | 6.7 |
| 10 - 11,000 | 13 | 6.7 |
| 11 - 12,000 | 27 | 14.0 |
| 12 - 13,000 | 12 | 6.2 |
| 13 - 14,000 | 14 | 7.3 |
| 14 - 15,000 | 14 | 7.3 |
| 15 - 20,000 | 19 | 9.8 |
| 20 - 30,000 | 8 | 4.1 |
| Over 30,000 | 2 | 1.0 |
| Missing | 16 | 8.3 |
| Don't Know | 8 | 4.1 |

### 4 FATHER'S OCCUPATION

| | N | % |
|---|---|---|
| Unskilled | 7 | 3.6 |
| Semi-skilled | 36 | 18.7 |
| Skilled | 50 | 25.9 |
| Professional | 66 | 34.2 |
| Undergraduate Student | 10 | 5.2 |
| Graduate Student | 1 | .5 |
| Other | 1 | .5 |
| Blank | 16 | 8.3 |
| No Response | 6 | 3.1 |

### 5 FATHER WORKED STEADY

| | N | % |
|---|---|---|
| Yes | 129 | 66.8 |
| No | 34 | 17.6 |
| Don't Know | 1 | .5 |
| Missing | 16 | 8.3 |
| No Response | 13 | 6.7 |

### WHY NOT WORK - FATHER

| | N | % |
|---|---|---|
| Ill | 9 | 4.7 |
| Seasonal | 3 | 1.6 |
| Student | 9 | 4.7 |
| Couldn't Find | 7 | 3.6 |
| Jail | 2 | 1.0 |
| Other | 3 | 1.6 |
| Missing | 16 | 8.3 |
| No Response | 144 | 74.6 |

### 6 FATHER CONTRIBUTING TO FINANCIAL SUPPORT

| | N | % |
|---|---|---|
| Yes | 159 | 82.4 |
| No | 10 | 5.2 |
| Missing | 16 | 8.3 |
| No Response | 8 | 4.1 |

### 7 CHILD DESCRIPTION

| | One | | Two | | Three | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Don't Know | 2 | 1.0 | 0 | 0 | 0 | 0 |
| Like Others | 1 | .5 | 0 | 0 | 0 | 0 |
| Physical | 116 | 60.1 | 3 | 1.6 | 0 | 0 |
| Pos. Temp | 33 | 17.1 | 39 | 20.2 | 2 | 1.0 |
| Neg. Temp | 9 | 4.7 | 12 | 6.2 | 1 | .5 |
| Dependent | 1 | .5 | 3 | 1.6 | 0 | 0 |
| Individuality | 9 | 4.7 | 44 | 22.8 | 15 | 7.8 |
| Other | 5 | 2.6 | 4 | 2.1 | 2 | 1.0 |
| Missing | 16 | 8.3 | 16 | 8.3 | 16 | 8.3 |
| No Response | 1 | .5 | 72 | 37.3 | 157 | 81.3 |

### 8 MOTHER'S EXPERIENCE

| | One | | Two | | Three | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Positive | 100 | 51.8 | 2 | 1.0 | 0 | 0 |
| Negative | 21 | 10.9 | 5 | 2.6 | 0 | 0 |
| Adjusting | 17 | 8.8 | 10 | 5.2 | 0 | 0 |
| Improving | 2 | 1.0 | 18 | 9.3 | 2 | 1.0 |
| Tiring | 9 | 4.7 | 14 | 7.3 | 1 | .5 |
| Fulfilling | 8 | 4.1 | 7 | 3.6 | 8 | 4.1 |
| Other | 20 | 10.4 | 7 | 3.6 | 2 | 1.0 |
| Missing | 16 | 8.3 | 16 | 8.3 | 16 | 8.3 |
| Mother's Health | 0 | 0 | 2 | 1.0 | 1 | .5 |
| Tied Down | 0 | 0 | 4 | 2.1 | 0 | 0 |
| No Response | 0 | 0 | 108 | 56.0 | 163 | 84.5 |

### 9 MOTHER WORKING OR IN SCHOOL

| | N | % |
|---|---|---|
| Yes | 87 | 45.1 |
| No | 87 | 45.1 |
| Missing | 16 | 8.3 |
| No Response | 3 | 1.6 |

### 9a DAYS PER WEEK

| | N | % |
|---|---|---|
| One | 10 | 5.2 |
| Two | 13 | 6.7 |
| Three | 14 | 7.3 |
| Four | 5 | 2.6 |
| Five | 48 | 24.9 |
| Missing | 16 | 8.3 |
| No Response | 87 | 45.1 |

### 9b CHILD'S AGE WHEN BEGAN

| | | |
|---|---|---|
| One month | 13 | 6.7 |
| Two months | 2 | 1.0 |
| Three months | 11 | 5.7 |
| Four months | 9 | 4.7 |
| Five months | 5 | 2.6 |
| Six months | 9 | 4.7 |
| Seven months | 5 | 2.6 |
| Eight months | 5 | 2.6 |
| Nine months | 9 | 4.7 |
| Ten months | 9 | 4.7 |
| Eleven months | 9 | 4.7 |
| Twelve months | 4 | 2.1 |
| Fifteen months | 1 | .5 |
| Missing | 16 | 8.3 |
| No Response | 86 | 44.6 |

### 9c CARETAKER

| | N | % |
|---|---|---|
| Friend | 20 | 10.4 |
| Relative | 39 | 20.2 |
| Sitter | 20 | 10.4 |
| Day Care | 10 | 5.2 |
| Missing | 16 | 8.3 |
| No Response | 88 | 45.6 |

### 9d PLACE OF CARE

| | N | % |
|---|---|---|
| Own Home | 37 | 19.2 |
| Out of Home | 54 | 28.0 |
| Missing | 16 | 8.3 |
| No Response | 86 | 44.6 |

### 9f SATISFACTION WITH CARETAKER

| | N | % |
|---|---|---|
| Satisfied | 87 | 45.1 |
| Dissatisfied | 1 | .5 |
| Missing | 16 | 8.3 |
| No Response | 89 | 46.1 |

### 18 ENJOY MOST ABOUT CHILD

| | | | OTHER RESPONSES | |
|---|---|---|---|---|
| | N | % | N | % |
| Pride | 17 | 8.8 | 0 | 0 |
| Observing child | 124 | 64.2 | 5 | 2.6 |
| Healthy, Happy | 9 | 4.7 | 6 | 3.1 |
| Care taking | 1 | .5 | 3 | 1.6 |
| Playing | 14 | 7.3 | 23 | 11.9 |
| Baby Independent | 5 | 2.6 | 1 | .5 |
| Other | 7 | 3.6 | 0 | 0 |
| Missing | 16 | 8.3 | 16 | 8.3 |
| No Response | 0 | 0 | 139 | 72.0 |

### 19 HARDEST PART ABOUT CHILD

| | | | OTHER RESPONSES | |
|---|---|---|---|---|
| | N | % | N | % |
| Not enough time | 4 | 2.1 | 0 | 0 |
| Patience | 17 | 8.8 | 0 | 0 |
| Not able to get out | 5 | 2.6 | 2 | 1.0 |
| Responsibility | 3 | 1.6 | 0 | 0 |
| Character Development | 20 | 10.2 | 2 | 1.0 |
| Child Care, caretaking | 108 | 56.0 | 2 | 1.0 |
| Can't communicate | 3 | 1.6 | 1 | .5 |
| Missing | 16 | 8.3 | 0 | 0 |
| Nothing | 17 | 8.8 | 0 | 0 |
| Being good mom | 0 | 0 | 2 | 1.0 |

### CHILD'S PHYSICAL ACTIVITY

| | N | % |
|---|---|---|
| High | 116 | 60.1 |
| Moderate | 61 | 31.6 |
| Missing | 16 | 8.3 |

### 22 RHYTHMICITY

| | N | % |
|---|---|---|
| Regular | 60 | 31.1 |
| Variable | 107 | 55.4 |
| Irregular | 10 | 5.2 |

### 24 APPROACH WITHDRAWAL

| | N | % |
|---|---|---|
| Accepts | 116 | 60.1 |
| Variable | 53 | 27.5 |
| Withdraws | 6 | 3.1 |
| Missing | 16 | 8.3 |
| No Response | 2 | 1.0 |

### 26 ADAPTABILITY

| | N | % |
|---|---|---|
| Adaptable | 125 | 64.8 |
| Variable | 42 | 21.8 |
| Slow to Adapt | 7 | 3.6 |
| Missing | 15 | 7.8 |
| No Response | 4 | 2.1 |

### 28 INTENSITY

| | N | % |
|---|---|---|
| Intense | 88 | 45.6 |
| Variable | 81 | 42.0 |
| Quiet | 7 | 3.6 |
| Missing | 15 | 7.8 |
| No Response | 2 | 1.0 |

### 30 DISTRACTIBILITY

| | N | % |
|---|---|---|
| Easily | 52 | 26.9 |
| Variable | 97 | 50.3 |
| Not | 27 | 14.0 |
| Missing | 15 | 7.8 |
| No Response | 2 | 1.0 |

### 32 SENSITIVITY TO NOISES

| | N | % |
|---|---|---|
| Very | 53 | 27.5 |
| Moderate | 95 | 49.2 |
| Mildly | 28 | 14.5 |
| Missing | 17 | 8.8 |

### 34 MOOD

| | N | % |
|---|---|---|
| Contented | 157 | 81.3 |
| Variable | 20 | 10.4 |
| Missing | 16 | 8.3 |

### 36 PERSISTENCE AND ATTENTION SPAN

| | N | % |
|---|---|---|
| Long | 87 | 45.1 |
| Variable | 83 | 43.0 |
| Momentarily | 7 | 3.6 |
| Missing | 16 | 8.3 |

### 38 TEMPERAMENT CONCERN

| | ONE | | TWO | |
|---|---|---|---|---|
| | N | % | N | % |
| Physical Activity | 26 | 13.5 | 3 | 1.6 |
| Regularity | 38 | 19.7 | 5 | 2.6 |
| Approach | 6 | 3.1 | 2 | 1.0 |
| Adaptability | 6 | 3.1 | 3 | 1.6 |
| Intensity | 5 | 2.6 | 1 | .5 |
| Distractibility | 8 | 4.1 | 4 | 2.1 |
| Sensitivity | 3 | 1.6 | 1 | .5 |
| Mood | 2 | 1.0 | 4 | 2.1 |
| Persistence | 12 | 6.2 | 5 | 2.6 |
| Missing | 15 | 7.8 | 15 | 7.8 |
| None | 72 | 37.3 | 150 | 77.7 |

### 39 HOW TO TEACH DISCIPLINE

| | | | DIDN'T USE | | MISSING | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| No No | 146 | 75.6 | 32 | 16.6 | 15 | 7.8 |
| Slap Hands | 97 | 50.3 | 81 | 42.0 | 15 | 7.8 |
| Remove Object | 28 | 14.5 | 150 | 77.7 | 15 | 7.8 |
| Remove Child | 66 | 34.2 | 112 | 58.0 | 15 | 7.8 |
| Distraction | 44 | 22.8 | 134 | 69.4 | 15 | 7.8 |
| Other | 71 | 36.8 | 107 | 55.4 | 15 | 7.8 |

### 40 THINGS HAVE HAD TO DISCIPLINE FOR:

| | ONE | | TWO | | THREE | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Dangerous | 51 | 26.4 | 29 | 15.0 | 21 | 10.9 |
| Breakable | 13 | 6.7 | 4 | 2.1 | 4 | 2.1 |
| Disturb Parents | 109 | 56.5 | 85 | 44.0 | 38 | 19.7 |
| Disturb Others | 1 | .5 | 1 | .5 | 1 | .5 |
| Disturb both parents & others | 1 | .5 | 0 | 0 | | |
| Missing | 15 | 7.8 | 15 | 7.8 | 15 | 7.8 |
| No Response | 3 | 1.6 | 59 | 30.6 | 114 | 59.1 |

### 40 METHOD OF HANDLING DISCIPLINE

| | ONE | | TWO | | THREE | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| No No | 93 | 48.2 | 52 | 26.9 | 28 | 14.5 |
| Slap Hands | 26 | 13.5 | 26 | 13.5 | 9 | 4.7 |
| Remove Object | 1 | .5 | 5 | 2.6 | 2 | 1.0 |
| Remove Child | 7 | 3.6 | 11 | 5.7 | 8 | 4.1 |
| Distraction | 4 | 2.1 | 3 | 1.6 | 2 | 1.0 |
| Spank | 10 | 5.2 | 9 | 4.7 | 4 | 2.1 |
| Nothing | 2 | 1.0 | 2 | 1.0 | 2 | 1.0 |
| Other | 11 | 5.7 | 6 | 3.1 | 3 | 1.6 |
| Missing | 15 | 7.8 | 15 | 7.8 | 15 | 7.8 |
| No Response | 24 | 12.4 | 64 | 33.2 | 120 | 62.2 |

### 41 HOW OFTEN DISCIPLINE

| | N | % |
|---|---|---|
| 0 - 1 per week | 23 | 11.9 |
| 2 - 6 per week | 27 | 14.0 |
| 1 - 2 per day | 43 | 22.3 |
| 3 - 5 per day | 33 | 17.1 |
| 6 -10 per day | 16 | 8.3 |
| 11 -20 per day | 3 | 1.6 |
| 21 - more per day | 6 | 3.1 |
| Other | 7 | 3.6 |
| Missing | 15 | 7.8 |
| No Response | 20 | 10.4 |

42 & 43 HUSBAND WIFE AGREEMENT RE:

| | DISCPLINE | | CHILDREARING | |
|---|---|---|---|---|
| | N | % | N | R |
| None | 5 | 2.6 | 3 | 1.6 |
| Very Little | 1 | .5 | 2 | 1.0 |
| Moderate | 20 | 10.4 | 13 | 6.7 |
| Good Bit | 50 | 25.9 | 64 | 33.2 |
| Great Deal | 95 | 49.2 | 86 | 44.6 |
| Missing | 15 | 7.8 | 15 | 7.8 |
| No Response | 7 | 3.6 | 10 | 5.2 |

44 AREAS OF DISAGREEMENT

| | N | % |
|---|---|---|
| None | 52 | 26.9 |
| Rewards | 4 | 2.1 |
| Punishment | 33 | 17.1 |
| Dependency | 2 | 1.0 |
| Restrictions | 50 | 25.9 |
| Sex Typing | 1 | .5 |
| Play | 2 | 1.0 |
| Other | 17 | 8.8 |
| Missing | 15 | 7.8 |
| No Response | 17 | 8.8 |

45 HOW MOTHER MANAGES TIME

| | N | % |
|---|---|---|
| Mother Centered | 33 | 17.1 |
| Child Centered | 98 | 50.8 |
| Father Centered | 1 | .5 |
| Task Centered | 22 | 11.4 |
| Job Centered | 4 | 2.1 |
| Other | 14 | 7.3 |
| Missing | 16 | 8.3 |
| No Response | 5 | 2.6 |

47 ACTIVITY WITH CHILD

| | | | OTHER RESPONSES | | | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Rock Sing | 37 | 19.2 | 1 | .5 | 2 | 1.0 |
| Talk Read | 28 | 14.5 | 14 | 7.3 | 0 | 0 |
| Visual Play | 18 | 9.3 | 7 | 3.6 | 0 | 0 |
| Motor Play | 24 | 12.4 | 20 | 10.4 | 3 | 1.6 |
| Social Play | 12 | 6.2 | 4 | 2.1 | 2 | 1.0 |
| Unspecified | 43 | 22.3 | 23 | 11.9 | 6 | 3.1 |
| | 2 | 1.0 | 3 | 1.6 | 1 | .5 |
| Hold Carry | 8 | 4.1 | 10 | 5.2 | 5 | 2.6 |
| Other | 2 | 1.0 | 0 | 0 | 2 | 1.0 |
| Missing | 16 | 8.3 | 16 | 8.3 | 16 | 8.3 |
| No Response | 3 | 1.6 | 95 | 49.2 | 156 | 80.8 |

46 AMOUNT TIME WITH CHILD

| | N | % |
|---|---|---|
| Less than 15 minutes | 76 | 39.4 |
| 15 - 29 minutes | 32 | 16.6 |
| 30 - 44 minutes | 18 | 9.3 |
| 45 - 59 minutes | 15 | 7.8 |
| 1 - 2 hours | 21 | 10.9 |
| 2 - 3 hours | 6 | 3.1 |
| 3 hours or more | 3 | 1.6 |
| Other | 1 | .5 |
| Missing | 16 | 8.3 |
| No Response | 5 | 2.6 |

46 TIMES PER DAY

| | N | % |
|---|---|---|
| One | 48 | 24.9 |
| Two | 33 | 17.1 |
| Three | 29 | 15.0 |
| Four | 16 | 8.3 |
| Five | 10 | 5.2 |
| Six | 15 | 7.8 |
| Seven | 2 | 1.0 |
| Eight | 3 | 1.6 |
| Ten | 7 | 3.6 |
| Twelve | 1 | .5 |
| Fifteen | 2 | 1.0 |
| Missing | 16 | 8.3 |
| No Response | 11 | 5.7 |

48 CHILD'S PLAY AREA

| | N | % |
|---|---|---|
| Run of House | 73 | 37.8 |
| Certain Rooms | 89 | 46.1 |
| Play Pen | 3 | 1.6 |
| Other | 9 | 4.7 |
| Missing | 16 | 8.3 |
| No Response | 3 | 1.6 |

49 MOTHER TEACHES

| | ONE | | TWO | | THREE | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Nothing | 3 | 1.6 | 0 | 0 | 0 | 0 |
| Visual Skills | 17 | 8.8 | 3 | 1.6 | 0 | 0 |
| Grasping | 7 | 3.6 | 5 | 2.6 | 1 | .5 |
| Language | 93 | 48.2 | 16 | 8.3 | 3 | 1.6 |
| Eating | 18 | 9.3 | 28 | 14.5 | 3 | 1.6 |
| Motor | 22 | 11.4 | 44 | 22.8 | 19 | 9.8 |
| Games-Toys | 9 | 4.7 | 12 | 6.2 | 11 | 5.7 |
| Social Develop | 4 | 2.1 | 19 | 9.8 | 10 | 5.2 |
| Other | 1 | .5 | 3 | 1.6 | 5 | 2.6 |
| Missing | 16 | 8.3 | 16 | 8.3 | 16 | 8.3 |
| No Response | 3 | 1.6 | 47 | 24.4 | 125 | 64.8 |

50 FATHER TEACHES

| | ONE | | TWO | | THREE | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Nothing | 6 | 3.1 | 0 | 0 | 0 | 0 |
| Visual Skills | 10 | 5.2 | 1 | .5 | 0 | 0 |
| Grasping | 6 | 3.1 | 0 | 0 | 0 | 0 |
| Language | 76 | 39.4 | 12 | 6.2 | 0 | 0 |
| Eating | 7 | 3.6 | 14 | 7.3 | 0 | 0 |
| Motor | 40 | 20.7 | 40 | 20.7 | 15 | 7.8 |
| Games-Toys | 11 | 5.7 | 12 | 6.2 | 7 | 3.6 |
| Social Develop | 6 | 3.1 | 15 | 7.8 | 6 | 3.1 |
| Other | 2 | 1.0 | 3 | 1.6 | 0 | 0 |
| Missing | 16 | 8.3 | 16 | 8.3 | 16 | 8.3 |
| No Response | 13 | 6.7 | 80 | 41.5 | 149 | 77.2 |

51 FUTURE PLANS FOR CHILD

| | N | % | N | % |
|---|---|---|---|---|
| Physical Appearance | 3 | 1.6 | 2 | 1.0 |
| Health | 2 | 1.0 | 5 | 2.6 |
| Intelligence | 2 | 1.0 | 0 | 0 |
| Education | 76 | 39.4 | 20 | 10.4 |
| Social | 17 | 8.8 | 8 | 4.1 |
| Material | 6 | 3.1 | 1 | .5 |
| Spiritual | 10 | 5.2 | 2 | 1.0 |
| Other | 26 | 13.5 | 12 | 6.2 |
| Missing | 16 | 8.3 | 16 | 8.3 |
| No Response | 35 | 18.1 | 127 | 65.8 |

52 CHILD'S SUCCESS IN SCHOOL

| | N | % |
|---|---|---|
| Above Average | 51 | 26.4 |
| Average | 98 | 50.8 |
| Below Average | 1 | .5 |
| Don't Know | 24 | 12.4 |
| Missing | 16 | 8.3 |
| No Response | 3 | 1.6 |

53 HOW FAR IN SCHOOL

| | N | % |
|---|---|---|
| High School | 43 | 22.3 |
| Trade School | 6 | 3.1 |
| 1 - 2 years College | 17 | 8.8 |
| Complete College | 77 | 39.9 |
| Beyond College | 6 | 3.1 |
| As Child Wants | 21 | 10.9 |
| Other | 1 | .5 |
| Missing | 16 | 8.3 |
| No Response | 6 | 3.1 |

54a DEVELOPMENTAL CONCERNS

| | N | % |
|---|---|---|
| Yes | 52 | 26.9 |
| No | 116 | 60.1 |
| Missing | 16 | 8.3 |
| No Response | 9 | 4.7 |

54b AREA OF DEVELOPMENTAL CONCERN

| | N | % |
|---|---|---|
| Physical | 21 | 10.9 |
| Self Help | 5 | 2.6 |
| Social | 4 | 2.1 |
| Intellectual | 2 | 1.0 |
| Receptive Language | 6 | 3.1 |
| Expressive Language | 2 | 1.0 |
| Developmental Milestones | 1 | .5 |
| Other | 3 | 1.6 |
| Missing | 16 | 8.3 |
| No Response | 133 | 68.9 |

### 55 EXTENT CHILD HAS CHANGED LIFE

| | N | % |
|---|---|---|
| None | 2 | 1.0 |
| Very Little | 11 | 5.7 |
| Moderate | 53 | 27.5 |
| Good Bit | 48 | 24.9 |
| Great Deal | 62 | 32.1 |
| Missing | 16 | 8.3 |
| No Response | 1 | .5 |

### 56 MOST HELP

| | N | % |
|---|---|---|
| Husband | 97 | 50.3 |
| Relative | 39 | 20.3 |
| Friend | 11 | 5.7 |
| Organization | 9 | 4.7 |
| No One | 7 | 3.6 |
| Other | 12 | 6.2 |
| Missing | 16 | 8.3 |
| No Response | 2 | 1.0 |

### 57 KIND OF HELP

| | N | % |
|---|---|---|
| Emotional | 24 | 12.4 |
| Physical | 39 | 20.2 |
| Emotional-Physical | 51 | 26.2 |
| Advice | 39 | 20.2 |
| None | 4 | 2.1 |
| Other | 15 | 7.8 |
| Missing | 16 | 8.3 |
| No Response | 5 | 2.6 |

### 58 EXTENT OF HELP

| | N | % |
|---|---|---|
| More Than Need | 17 | 8.8 |
| As Much As Needed | 132 | 68.4 |
| Less than Needed | 21 | 10.9 |
| Lot Less | 1 | .5 |
| Missing | 16 | 8.3 |
| No Response | 6 | 3.1 |

### 59 MOTHERHOOD FEELINGS

| | | | OTHER RESPONSES | |
|---|---|---|---|---|
| | N | % | N | % |
| Positive | 160 | 82.9 | 1 | .5 |
| Neutral | 3 | 1.6 | 0 | 0 |
| Ambivalent | 9 | 4.7 | 0 | 0 |
| Negative | 1 | .5 | 2 | 1.0 |
| Adjusting | 1 | .5 | 1 | .5 |
| Other | 2 | 1.0 | 0 | 0 |
| Missing | 16 | 8.3 | 16 | 8.3 |
| No Response | 1 | .5 | 154 | 79.8 |
| Responsibility | 0 | 0 | 2 | 1.0 |
| Challenge | 0 | 0 | 3 | 1.6 |
| Confining | 0 | 0 | 4 | 2.1 |
| Other | 0 | 0 | 10 | 5.2 |

### 60 PLANS FOR OTHER CHILDREN

| | N | % |
|---|---|---|
| Yes | 132 | 68.4 |
| No | 23 | 11.9 |
| Don't Know | 19 | 9.8 |
| Missing | 16 | 8.3 |
| No Response | 3 | 1.6 |

### 61 MOTHER'S PRIMARY CONCERN

| | ONE | | TWO | | THREE | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Parent's Health | 13 | 6.7 | 1 | .5 | 0 | 0 |
| Child's Health | 10 | 5.2 | 2 | 1.0 | 0 | 0 |
| Development | 15 | 7.8 | 3 | 1.6 | 0 | 0 |
| Caretaking | 3 | 1.6 | 4 | 2.1 | 1 | .5 |
| Finances | 62 | 32.1 | 8 | 4.1 | 1 | .5 |
| Practical | 16 | 8.3 | 11 | 5.7 | 1 | .5 |
| Family Relations | 15 | 7.8 | 17 | 8.8 | 3 | 1.6 |
| Parenthood | 13 | 6.7 | 10 | 5.2 | 2 | 1.0 |
| Other | 8 | 4.1 | 8 | 4.1 | 1 | .5 |
| Missing | 16 | 8.3 | 16 | 8.3 | 16 | 8.3 |
| No Response | 22 | 11.4 | 113 | 58.5 | 168 | 87.0 |

### 62 FATHER'S PRIMARY CONCERN

| | ONE | | TWO | | THREE | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Parent's Health | 4 | 2.1 | 0 | 0 | 0 | 0 |
| Child's Health | 10 | 5.2 | 3 | 1.6 | 0 | 0 |
| Development | 8 | 4.1 | 1 | .5 | 1 | .5 |
| Caretaking | 3 | 1.6 | 1 | .5 | 1 | .5 |
| Finances | 96 | 49.7 | 7 | 3.6 | 2 | 1.0 |
| Practical | 10 | 5.2 | 10 | 5.2 | 0 | 0 |
| Family Relations | 10 | 5.2 | 17 | 8.8 | 0 | 0 |
| Parenthood | 6 | 3.1 | 4 | 2.1 | 0 | 0 |
| Other | 3 | 1.6 | 5 | 2.6 | 1 | .5 |
| Missing | 16 | 8.3 | 16 | 8.3 | 16 | 8.3 |
| No Response | 27 | 14.0 | 129 | 66.8 | 172 | 89.1 |

### 63 SUGGESTIONS FOR NEW MOTHERS

| | N | % |
|---|---|---|
| Feeding | 8 | 4.1 |
| Teaching | 7 | 3.6 |
| Activities for Parents | | |
| "Relax"-don't worry" | 83 | 43.0 |
| Accidents | 3 | 1.6 |
| Child's Temperament | 2 | 1.0 |
| Other | 65 | 33.7 |
| Missing | 16 | 8.3 |
| No Response | 9 | 4.7 |

### 64 INFLUENCE OF STUDY ON:

| | | N | % |
|---|---|---|---|
| Feeding | | | |
| | No | 153 | 79.3 |
| | Yes | 23 | 11.9 |
| Teaching | | | |
| | No | 100 | 51.8 |
| | Yes | 77 | 39.9 |
| Activities | | | |
| | No | 138 | 71.5 |
| | Yes | 38 | 19.7 |
| Health | | | |
| | No | 162 | 83.9 |
| | Yes | 15 | 7.8 |
| Accidents | | | |
| | No | 161 | 83.4 |
| | Yes | 16 | 8.3 |
| Temperament | | | |
| | No | 150 | 77.7 |
| | Yes | 27 | 14.0 |
| Language | | | |
| | No | 129 | 66.8 |
| | Yes | 48 | 24.9 |
| Record Keeping | | | |
| | No | 140 | 79.5 |
| | Yes | 37 | 19.2 |

## FREQUENCY DISTRIBUTION FOR PARENT PERCEPTION VARIABLE SETS

| Source | Variable Set | Code | Abs. Frequency | Rel. Frequency |
|---|---|---|---|---|
| Prenatal | Mother's Psycho-social Assets | 2.0 | 2 | 1.0% |
| | | 3.0 | 4 | 2.1 |
| | | 4.0 | 7 | 3.6 |
| | | 5.0 | 24 | 12.4 |
| | | 5.71 | 2 | 1.0 |
| | | 6.0 | 32 | 16.6 |
| | | 6.67 | 2 | 1.0 |
| | | 6.86 | 3 | 1.6 |
| | | 7.0 | 50 | 25.9 |
| | | 8.0 | 61 | 31.6 |
| | | Missing | 6 | 3.1 |
| 1 Month | | 0 | 10 | 5.2 |
| | | 1.0 | 46 | 23.8 |
| | | 2.0 | 133 | 68.9 |
| | | Missing | 4 | 2.1 |
| 4 Month | | 0 | 3 | 1.6 |
| | | 1.0 | 6 | 3.1 |
| | | 1.50 | 6 | 3.1 |
| | | 2.0 | 57 | 29.5 |
| | | 3.0 | 105 | 54.4 |
| | | Missing | 16 | 8.3 |
| 8 Month | | 0 | 3 | 1.6 |
| | | 1.0 | 10 | 5.2 |
| | | 1.50 | 5 | 2.6 |
| | | 2.0 | 38 | 19.7 |
| | | 3.0 | 106 | 54.9 |
| | | Missing | 31 | 16.1 |
| 12 Month | | 0 | 3 | 1.6 |
| | | 1.0 | 10 | 5.2 |
| | | 1.50 | 8 | 4.1 |
| | | 2.0 | 69 | 35.8 |
| | | 3.0 | 88 | 45.6 |
| | | Missing | 15 | 7.8 |
| Prenatal | Father Involvement | 0 | 12 | 6.2% |
| | | 1.0 | 5 | 2.6 |
| | | 2.0 | 7 | 3.6 |
| | | 2.5 | 2 | 1.0 |
| | | 3.0 | 6 | 3.1 |
| | | 3.75 | 4 | 2.1 |
| | | 4.0 | 32 | 16.6 |
| | | 5.0 | 119 | 61.7 |
| | | Missing | 6 | 3.1 |
| 1 Month | | 0 | 34 | 17.6 |
| | | 1.0 | 52 | 26.9 |
| | | 1.50 | 6 | 3.1 |
| | | 2.0 | 62 | 32.1 |
| | | 3.0 | 35 | 18.1 |
| | | Missing | 4 | 2.1 |
| 4 Month | | 0 | 12 | 6.2 |
| | | 1.0 | 8 | 4.1 |
| | | 1.25 | 1 | .5 |
| | | 1.67 | 1 | .5 |
| | | 2.00 | 19 | 9.8 |
| | | 2.50 | 4 | 2.1 |
| | | 3.0 | 53 | 27.5 |
| | | 3.75 | 6 | 3.1 |
| | | 4.0 | 44 | 22.8 |
| | | 5.0 | 29 | 15.0 |
| | | Missing | 16 | 8.3 |
| 8 Month | | 0 | 5 | 2.6 |
| | | 1.0 | 17 | 8.8 |
| | | 2.0 | 33 | 17.1 |
| | | 2.67 | 1 | .5 |
| | | 3.0 | 52 | 26.9 |
| | | 4.0 | 53 | 27.5 |
| | | Missing | 32 | 16.6 |
| 12 Month | | 0 | 12 | 6.2 |
| | | 1.0 | 48 | 24.9 |
| | | 1.50 | 9 | 4.7 |
| | | 2.0 | 80 | 41.5 |
| | | 3.0 | 28 | 14.5 |
| | | Missing | 16 | 8.3 |
| 1 Month | Mother Involvement | 0 | 4 | 2.1% |
| | | 1.0 | 29 | 15.0 |
| | | 1.50 | 11 | 5.7 |
| | | 2.0 | 90 | 46.6 |
| | | 3.0 | 55 | 28.5 |
| | | Missing | 4 | 2.1 |

| Source | Variable Set | Code | Abs. Frequency | Rel. Frequency |
|---|---|---|---|---|
| 4 Month | (Mother Involvement--cont'd) | 0 | 2 | 1.0 |
| | | 1.0 | 42 | 21.8 |
| | | 1.50 | 10 | 5.2 |
| | | 2.0 | 69 | 35.8 |
| | | 3.0 | 54 | 28.0 |
| | | Missing | 16 | 8.3 |
| 8 Month | | 0 | 1 | .5 |
| | | 1.0 | 47 | 24.4 |
| | | 1.50 | 10 | 5.2 |
| | | 2.0 | 71 | 36.8 |
| | | 3.0 | 33 | 17.1 |
| | | Missing | 31 | 16.1 |
| 12 Month | | 0 | 1 | .5 |
| | | 1.0 | 32 | 16.6 |
| | | 1.33 | 12 | 6.2 |
| | | 2.0 | 60 | 31.1 |
| | | 2.67 | 18 | 9.3 |
| | | 3.0 | 39 | 20.2 |
| | | 4.0 | 14 | 7.3 |
| | | Missing | 17 | 8.8 |
| 1 Month | Parent Mutuality | 0 | 13 | 6.7 |
| | | 1.0 | 48 | 24.9 |
| | | 2.0 | 49 | 25.4 |
| | | 3.0 | 79 | 40.9 |
| | | Missing | 4 | 2.1 |
| 12 Month | | 0 | 3 | 1.6 |
| | | 1.0 | 5 | 2.6 |
| | | 2.0 | 163 | 84.5 |
| | | Missing | 22 | 11.4 |
| 1 Month | Concerns re Infant | 0 | 106 | 54.9% |
| | | 1.0 | 58 | 30.1 |
| | | 2.0 | 25 | 13.0 |
| | | Missing | 4 | 2.1 |
| 4 Month | | 0 | 100 | 51.8 |
| | | 1.0 | 58 | 30.1 |
| | | 2.0 | 21 | 10.9 |
| | | Missing | 14 | 7.3 |
| 8 Month | | 0 | 89 | 46.1 |
| | | 1.0 | 53 | 27.5 |
| | | 2.0 | 23 | 11.9 |
| | | Missing | 28 | 14.5 |
| 12 Month | | 0 | 47 | 24.4 |
| | | 1.0 | 52 | 26.9 |
| | | 1.50 | 8 | 4.1 |
| | | 2.0 | 52 | 26.9 |
| | | 3.0 | 19 | 9.8 |
| | | Missing | 15 | 7.8 |
| 1 Month | Difficult Child | 0 | 113 | 58.5 |
| | | 1.0 | 51 | 26.4 |
| | | 2.0 | 20 | 10.4 |
| | | 3.0 | 2 | 1.0 |
| | | Missing | 7 | 3.6 |
| 4 Month | | 0 | 96 | 49.7 |
| | | 1.0 | 72 | 37.3 |
| | | 2.0 | 8 | 4.1 |
| | | 3.0 | 1 | .5 |
| | | Missing | 16 | 8.3 |
| 8 Month | | 0 | 85 | 44.0 |
| | | 1.0 | 68 | 35.2 |
| | | 2.0 | 6 | 3.1 |
| | | Missing | 34 | 17.6 |
| 12 Month | | 0 | 74 | 38.3 |
| | | 1.0 | 85 | 44.0 |
| | | 2.0 | 10 | 5.2 |
| | | 3.0 | 1 | .5 |
| | | Missing | 23 | 11.9 |
| 12 Month | Achievement Expectations | 2.0 | 25 | 13.0% |
| | | 3.0 | 13 | 6.7 |
| | | 4.0 | 13 | 6.7 |
| | | 6.0 | 51 | 26.4 |
| | | 9.0 | 29 | 15.0 |
| | | Missing | 62 | 32.1 |

# APPENDIX 5.8

## CORRELATIONS AMONG PARENT PERCEPTION VARIABLES

### AT PRENATAL

| | Father Involvement | Developmental Expectations |
|---|---|---|
| Mother's Psycho-Social Assets | .39* | -.09* |
| Father Involvement | | -.16* |

*Kendall Correlation Coefficients; $p < .05$; Range of N=174-187

### AT ONE MONTH

| | Father Involvement | Mother Involvement | Parent Mutuality | Mother's Concerns About Infant | Neonatal Perception Inventory | Child's Temperament | Mother's Temperament |
|---|---|---|---|---|---|---|---|
| Mother's Psycho-Social Assets | .08* | .04 | .17* | -.09* | .12* | -.15* | -.17* |
| Father Involvement | | .22* | .30* | .13* | .06 | .03 | .04 |
| Mother Involvement | | | .11* | .13* | -.03 | .02 | -.00 |
| Parent Mutuality | | | | .11* | -.03 | .00 | -.02 |
| Mother's Concerns About Infant | | | | | -.24* | -.02 | .03 |
| Neonatal Perception Inventory | | | | | | -.18* | .05 |
| Child's Temperament | | | | | | | .26* |

*Kendall Correlation Coefficients; $p < .05$; N=184-189

### AT FOUR MONTHS

| | Father Involvement | Mother Involvement | Mother's Concerns About Infant | Child's Temperament |
|---|---|---|---|---|
| Mother's Psycho-Social Assets | .09* | .03 | -.12* | -.02 |
| Father Involvement | | .11* | -.13* | .06 |
| Mother Involvement | | | .11* | -.03 |
| Mother's Concerns About Infant | | | | .12* |

*Kendall Correlation Coefficients; $p < .05$; Range of N=174-177

## APPENDIX 5.8 (continued--page 2)

## CORRELATIONS AMONG PARENT PERCEPTION VARIABLES

### AT EIGHT MONTHS

| | Father Involvement | Mother Involvement | Mother's Concerns About Infant | Child's Temperament |
|---|---|---|---|---|
| Mother's Psycho-Social Assets | .11* | .01 | -.06 | -.02 |
| Father Involvement | | .08 | -.03 | -.08 |
| Mother Involvement | | | -.01 | -.06 |
| Mother's Concerns About Infant | | | | .15* |

*Kendall Correlation Coefficients;p < .05;Range of N= 158-162

### AT TWELVE MONTHS

| | Father Involvement | Mother Involvement | Parent Mutuality | Mother's Concern's About Infant | Achievement Expectations | Child's Temperament |
|---|---|---|---|---|---|---|
| Mother's Psycho-Social Assets | .12* | -.03 | -.00 | .04 | .10* | .00 |
| Father Involvement | | .02 | .03 | .01 | .05 | -.02 |
| Mother Involvement | | | .03 | .11* | -.02 | -.11 |
| Parent Mutuality | | | | .07 | .19* | .06 |
| Mother's Concerns About Infant | | | | | .12* | .01 |
| Achievement Expectations | | | | | | .08 |

*Kendall Correlation Coefficients;p < .05;Range of N=126-178

## APPENDIX 5.9

## INTERVIEWER OBSERVATION/EVALUATION

| | Newborn | | 1 mo. | | 4 mo. | | 8 mo. | | 12 mo. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % |
| Unusual Interview | | | | | | | | | | |
| No | 164 | 85.0 | 152 | 78.8 | 143 | 74.1 | 133 | 68.9 | 133 | 68.9 |
| Yes | 25 | 13.0 | 37 | 19.2 | 35 | 18.1 | 32 | 16.6 | 41 | 21.2 |
| Missing | 4 | 2.1 | 4 | 2.1 | 15 | 7.8 | 28 | 14.5 | 19 | 9.8 |
| Mother's Cooperation | | | | | | | | | | |
| Very | 171 | 88.6 | 172 | 89.1 | 165 | 85.5 | 159 | 82.4 | 169 | 87.6 |
| Fairly | 15 | 7.8 | 16 | 8.3 | 13 | 6.7 | 5 | 2.6 | 4 | 2.1 |
| Not Co-operative | 2 | 1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hostile | 0 | 0 | 1 | .5 | 0 | 0 | 0 | 0 | 1 | .5 |
| Missing | 5 | 2.6 | 4 | 2.1 | 15 | 7.8 | 29 | 15.0 | 19 | 9.8 |
| Distraction From Others (weighted code; high=more distraction) | | | | | | | | | | |
| 0 | 168 | 87.0 | 167 | 86.5 | 0 | 0 | 136 | 70.5 | 119 | 61.7 |
| 1 | 8 | 4.1 | 9 | 4.7 | 147 | 76.2 | 14 | 7.3 | 13 | 6.7 |
| 2 | 4 | 2.1 | 7 | 3.6 | 15 | 7.8 | 6 | 3.1 | 16 | 8.3 |
| 3 | 5 | 2.6 | 3 | 1.6 | 7 | 3.6 | 4 | 2.1 | 18 | 9.3 |
| 4 | 1 | .5 | 3 | 1.6 | 0 | 0 | 1 | .5 | 4 | 2.1 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1.0 |
| 6 | 0 | 0 | 0 | 0 | 6 | 3.1 | 4 | 2.1 | 1 | .5 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | .5 |
| 8 | 0 | 0 | 0 | 0 | 1 | .5 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 1 | .5 | 0 | 0 | 0 | 0 |
| Missing | 5 | 2.6 | 4 | 2.1 | 15 | 7.8 | 28 | 14.5 | 19 | 9.8 |
| Examiner Uncomfortable | | | | | | | | | | |
| No | 172 | 89.1 | 150 | 77.7 | 148 | 76.7 | 146 | 75.6 | 146 | 75.6 |
| Yes | 10 | 5.2 | 37 | 19.2 | 28 | 14.5 | 17 | 8.8 | 22 | 11.4 |
| Missing | 11 | 5.7 | 6 | 3.1 | 17 | 8.8 | 30 | 15.5 | 25 | 13.0 |

APPENDIX 5.9 (continued)

| | Newborn | | 1 mo. | | 4 mo. | | 8 mo. | | 12 mo. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % |
| Quality of Interview | | | | | | | | | | |
| Good | 157 | 81.3 | 160 | 82.9 | 150 | 77.7 | 135 | 69.9 | 140 | 72.5 |
| Fair | 29 | 15.0 | 28 | 14.5 | 27 | 14.0 | 29 | 15.0 | 30 | 15.5 |
| Poor | 3 | 1.6 | 1 | .5 | 1 | .5 | 1 | .5 | 3 | 1.6 |
| Missing | 4 | 2.1 | 4 | 2.1 | 15 | 7.8 | 28 | 14.5 | 20 | 10.4 |
| Examiner Likes Mom | | | | | | | | | | |
| Yes | 171 | 88.6 | 159 | 82.4 | 139 | 72.0 | 128 | 66.3 | 144 | 74.6 |
| Ambivalent | 15 | 7.8 | 28 | 14.5 | 37 | 19.2 | 34 | 17.6 | 27 | 14.0 |
| No | 1 | .5 | 1 | .5 | 1 | .5 | 1 | .5 | 2 | 1.0 |
| Missing | 6 | 3.1 | 5 | 2.6 | 16 | 8.3 | 30 | 15.5 | 20 | 10.4 |
| Information Matches Impressions | | | | | | | | | | |
| Yes | 115 | 59.6 | 141 | 73.1 | 119 | 61.7 | 117 | 60.6 | 136 | 70.5 |
| No | 9 | 4.7 | 17 | 8.8 | 27 | 14.0 | 25 | 13.0 | 30 | 15.5 |
| Missing | 69 | 35.8 | 35 | 18.1 | 47 | 24.4 | 51 | 26.4 | 27 | 14.0 |
| Interviewer Concerned | | | | | | | | | | |
| No | 182 | 94.3 | 165 | 85.5 | 142 | 73.6 | 137 | 71.0 | 70 | 36.3 |
| Yes | 7 | 3.6 | 23 | 11.9 | 33 | 17.1 | 27 | 14.0 | 104 | 53.9 |
| Missing | 4 | 2.1 | 5 | 2.6 | 18 | 9.3 | 29 | 15.0 | 19 | 9.8 |

## APPENDIX 5.10

## CAREY TEMPERAMENT QUESTIONNAIRE

The full Carey Temperament Questionnaire was scored according to procedures described by Carey (1970, p. 190):

> From the 70 items, 76 ratings were obtained in the nine categories of reactivity (six items gave points in two categories). The total ratings at the three levels in each category were then multiplied by 0, 1, and 2; e.g., the total of intense ratings was multiplied by 0, variable by 1, and mild by 2. These products were added and that sum divided by the total number of completed items in the category. This yielded a mean score between 0 and 2, representing the infant's typical reaction for that category. Each baby received 9 such category scores.

| | Intense | Variable | Mild |
|---|---|---|---|
| Activity | high | medium | low |
| Rhythmicity | irregular | variable | regular |
| Adaptability | not adaptable | variable | adaptable |
| Approach | withdrawing | variable | accepting |
| Threshold | low | medium | high |
| Intensity | intense | variable | not intense |
| Mood | negative | variable | positive |
| Distractibility | distractible | variable | not distractible |
| Persistence | persistent | variable | not persistent |

Using this method of scoring, the midpoint (1) can be used for a general description of the infants at each age level; viz., scores below the midpoint indicate the intense reactions listed above for the nine categories and those above the midpoint indicate the mild reactions listed above.

The descriptive statistics for the scores for the nine categories at each time point (Table A, i.e., using 1 as the midpoint), show the average one month infant to be active, regular, adaptable, high in initial approach, high in threshold, mild in intensity, positive in mood, distractible, and persistent. At 4,8, and 12 months the average infant can generally be characterized as active, regular, adaptable, high in initial approach, low in threshold, mild in intensity, positive in mood, distractible, and persistent. This general description of the 4 and 8 month old infants is the same as that described by Carey (1970, p. 190) for his sample of 101 infants in that age range. It should be noted that the direction of the values in relation to the midpoint differs from those reported by Carey (1970) since for our analysis we recoded the values so that higher scores indicate lower reactivity for all categories.

The infants were assigned to four groups on the basis of their scores on the five categories suggested by Carey (1970), including rhythmicity, adaptability, approach, intensity, and mood. The four groups and their definitions are as follows:

1) Difficult--having 4 to 5 intense scores (below the mean), 2 or more of which were greater than 1 S.D. below the mean.
2) Intermediate high--having 4 to 5 intense scores with 1 greater than 1 S.D. below the mean or 2 to 3 intense scores with 2 to 3 greater than 1 S.D. below the mean.
3) Intermediate low--having 3 to 5 intense scores with 0 greater than 1 S.D. below the mean or 1 to 3 intense scores with 1 greater than 1 S.D. below the mean.
4) Easy--having 0 to 2 intense scores with 0 greater than 1 S.D. below the mean.

The frequency distributions for the four groups at each time point are presented in Table B. The median group is intermediate low at all time points. There were 4 difficult infants at one month, 4 at four months, 3 at eight months, and none at 12 months.

In addition to the 70 items on the questionnaire, the mothers in the special cohort sample were asked to give their general impressions of their infants' temperament by rating each of the nine categories on a three-point scale ranging from intense to mild. They were also asked if the infant's temperament had been a problem and to rate the child's temperament as difficult, average, or easy. The frequency distributions for these items are presented in Table C.

## APPENDIX 5.10
### Table A
### DESCRIPTIVE STATISTICS FOR SCORES ON NINE CATEGORIES OF INFANT REACTIVITY FROM THE CAREY TEMPERAMENT QUESTIONNAIRE FOR 24 SPECIAL COHORT SUBJECTS AT 1, 4, 8, AND 12 MONTHS

| | | 1 mo. | 4 mo. | 8 mo. | 12 mo. |
|---|---|---|---|---|---|
| Activity | Mean | 0.71 | 0.53 | 0.39 | 0.37 |
| | S.D. | 0.33 | 0.28 | 0.26 | 0.27 |
| Rhythmicity | Mean | 1.13 | 1.37 | 1.34 | 1.35 |
| | S.D. | 0.41 | 0.41 | 0.43 | 0.46 |
| Adaptability | Mean | 1.48 | 1.57 | 1.61 | 1.58 |
| | S.D. | 0.29 | 0.24 | 0.24 | 0.28 |
| Approach | Mean | 1.45 | 1.46 | 1.63 | 1.56 |
| | S.D. | 0.42 | 0.38 | 1.95 | 0.32 |
| Threshold | Mean | 1.01 | 0.91 | 0.98 | 0.92 |
| | S.D. | 0.47 | 0.36 | 0.37 | 0.31 |
| Intensity | Mean | 1.22 | 1.18 | 1.10 | 1.09 |
| | S.D. | 0.24 | 0.28 | 0.20 | 0.19 |
| Mood | Mean | 1.27 | 1.56 | 1.53 | 1.55 |
| | S.D. | 0.24 | 0.24 | 0.21 | 0.24 |
| Distractibility | Mean | 0.69 | 0.54 | 0.40 | 0.44 |
| | S.D. | 0.29 | 0.27 | 0.25 | 0.35 |
| Persistence | Mean | 0.85 | 0.80 | 0.84 | 0.69 |
| | S.D. | 0.50 | 0.41 | 0.39 | 0.32 |

## APPENDIX 5.10
### Table B
### FREQUENCY DISTRIBUTION OF GROUPS BASED ON FIVE MAJOR CATEGORIES FROM THE CAREY TEMPERAMENT QUESTIONNAIRE FOR 24 SPECIAL COHORT SUBJECTS AT 1, 4, 8, AND 12 MONTHS

| | 1 mo. | | 4 mo. | | 8 mo. | | 12 mo. | |
|---|---|---|---|---|---|---|---|---|
| Value Group | N | % | N | % | N | % | N | % |
| 1) Difficult | 4 | 16.7 | 4 | 16.7 | 3 | 12.5 | 0 | 0 |
| 2) Intermediate High | 4 | 16.7 | 2 | 8.3 | 7 | 29.2 | 4 | 16.7 |
| 3) Intermediate Low | 7* | 29.2 | 11* | 45.8 | 3* | 12.5 | 11* | 45.8 |
| 4) Easy | 9 | 37.5 | 7 | 29.2 | 11 | 45.8 | 9 | 37.5 |

*Medians = 3.1 at 1 mo.; 3.0 at 4 mo.; 3.2 at 8 mo.; and 3.2 at 12 mo.

## APPENDIX 5.10
### Table C
### FREQUENCY DISTRIBUTIONS FOR MOTHER'S OVERALL RATINGS OF TEMPERAMENT FROM THE CAREY TEMPERAMENT QUESTIONNAIRE FOR 24 SPECIAL COHORT SUBJECTS AT 1, 4, 8, AND 12 MONTHS

| | | 1 mo. | | 4 mo. | | 8 mo. | | 12 mo. | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | % | N | % | N | % | N | % |
| Activity | High | 7 | 30.4 | 6 | 25.0 | 11 | 45.8 | 10 | 41.7 |
| | Medium | 16 | 69.6 | 17 | 70.8 | 12 | 50.0 | 14 | 58.3 |
| | Low | 0 | 0 | 1 | 4.2 | 1 | 4.2 | 0 | 0 |
| Rhythmicity | Irregular | 1 | 4.3 | 2 | 8.3 | 2 | 8.3 | 3 | 12.5 |
| | Variable | 8 | 34.8 | 9 | 37.5 | 8 | 33.3 | 6 | 25.0 |
| | Regular | 14 | 60.9 | 13 | 54.2 | 14 | 58.3 | 15 | 62.5 |
| Adaptability | Not adaptable | 0 | 0 | 2 | 8.3 | 0 | 0 | 1 | 4.2 |
| | Variable | 18 | 21.7 | 2 | 8.3 | 5 | 20.8 | 3 | 12.5 |
| | Adaptable | 1 | 78.3 | 20 | 83.3 | 19 | 79.2 | 20 | 83.3 |
| Approach | Withdrawing | 0 | 0 | 1 | 4.3 | 1 | 4.2 | 2 | 8.3 |
| | Variable | 15 | 71.4 | 8 | 34.8 | 6 | 25.0 | 8 | 33.3 |
| | Accepting | 6 | 28.6 | 14 | 60.9 | 17 | 70.8 | 14 | 58.3 |
| Threshold | Low | 7 | 30.4 | 10 | 41.7 | 14 | 58.3 | 11 | 45.8 |
| | Medium | 14 | 60.9 | 13 | 54.2 | 10 | 41.7 | 12 | 50.0 |
| | High | 2 | 8.7 | 1 | 4.2 | 0 | 0 | 1 | 4.2 |
| Intensity | Intense | 4 | 18.2 | 6 | 26.1 | 8 | 33.3 | 6 | 25.0 |
| | Variable | 16 | 72.7 | 16 | 69.6 | 16 | 66.7 | 16 | 66.7 |
| | Mild | 2 | 9.1 | 1 | 4.3 | 0 | 0 | 2 | 8.2 |
| Mood | Negative | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Variable | 10 | 43.5 | 6 | 25.0 | 1 | 4.2 | 2 | 8.3 |
| | Positive | 13 | 56.5 | 18 | 75.0 | 23 | 95.8 | 22 | 91.7 |
| Distractibility | Distractible | 2 | 8.7 | 5 | 20.8 | 13 | 54.2 | 6 | 25.0 |
| | Variable | 18 | 78.3 | 18 | 75.0 | 11 | 45.8 | 17 | 70.8 |
| | Not distractible | 3 | 13.0 | 1 | 4.3 | 0 | 0 | 1 | 4.2 |
| Persistence | Persistent | 7 | 31.8 | 7 | 30.4 | 8 | 33.3 | 13 | 54.2 |
| | Variable | 11 | 50.0 | 15 | 65.2 | 15 | 62.5 | 11 | 45.8 |
| | Not Persistent | 4 | 18.2 | 1 | 4.3 | 1 | 4.2 | 0 | 0 |
| Has temperament been a problem? | no | 9 | 47.4 | 12 | 52.2 | 10 | 45.5 | 11 | 50.0 |
| | yes | 10 | 52.6 | 11 | 47.8 | 12 | 54.5 | 11 | 50.0 |
| Rate temperament | difficult | 0 | 0 | 2 | 8.7 | 2 | 8.3 | 4 | 16.7 |
| | average | 12 | 52.2 | 9 | 39.1 | 11 | 45.8 | 6 | 25.0 |
| | easy | 11 | 47.8 | 12 | 52.2 | 11 | 45.8 | 14 | 58.3 |

24 mothers filled out questionnaire at all time points; number of missing responses ranged from 1-5 at one month, 0-1 at four months, 0-2 at eight months, 0-2 at twelve months.

## APPENDIX 5.11

### ANALYSES OF CHANGES IN OWN BABY AND AVERAGE BABY SCORE FOR FOUR COMBINED NPI GROUPS

| Combined NPI Score (Newborn-One Month) | Variable | Mean Change* | Difference Mean | S.D. | t-Value | 2-tail Probability |
|---|---|---|---|---|---|---|
| Positive - Positive (N = 115) | Change in Own Baby Score | 0.99 | 0.96 | 2.46 | 4.17 | .00 |
| | Change in Average Baby Score | 0.03 | | | | |
| Positive - Negative (N = 31) | Change in Own Baby Score | -3.19 | -3.77 | 2.08 | -10.12 | .00 |
| | Change in Average Baby Score | 0.58 | | | | |
| Negative - Negative (N = 11) | Change in Own Baby Score | 0.36 | -0.18 | 1.47 | -0.41 | .69 |
| | Change in Average Baby Score | 0.54 | | | | |
| Negative - Positive (N = 26) | Change in Own Baby Score | 2.73 | 3.69 | 1.52 | 12.41 | .00 |
| | Change in Average Baby Score | -0.96 | | | | |

*Positive Change = Less Trouble

## APPENDIX 5.12

## SUMMARY OF DISCRIMINANT ANALYSIS OF FOUR NPI GROUPS USING ONE MONTH VARIABLES

| Step | Variables | F to Enter | Wilks' Lambda | Sig. | Standardized Weights (Function 1) |
|---|---|---|---|---|---|
| 1 | Infant Temperament | 2.58 | .94 | .056 | -.67 |
| 2 | Negative Messages | 2.05 | .90 | .034 | .45 |
| 3 | Life Change | 1.98 | .86 | .022 | .43 |
| 4 | Mother's Psycho-Social Assets | 1.86 | .82 | .015 | .62 |

| Group | | Mean Discriminant Scores |
|---|---|---|
| Positive-positive | (N=84) | .06 |
| [illegible]ative-negative | (N=7) | .24 |
| Positive-negative | (N=25) | -.69 |
| Negative-positive | (N=17) | .58 |

APPENDIX 5.13

UNIVERSITY OF WASHINGTON
School of Nursing
NURSING CHILD ASSESSMENT PROJECT

Office use only

Code ________

## FATHER QUESTIONNAIRE

Name ______________________________
Last First Middle

Address ______________________________
Street Apt. City Zip

Phone ______________

Child's Name ______________________________
Last First Middle

## I. FIRST, WE ARE INTERESTED IN YOUR OBSERVATIONS ABOUT HOW YOUR CHILD IS GROWING, DEVELOPING AND GETTING ALONG:

1. Using the following scale, write the number that best describes your child's growth and development in each category:

1---much above average
2---above average
3---average
4---below average
5---much below average

_____ a. physically

_____ b. self-help abilities (doing things for himself, helping with dressing and eating)

_____ c. socially (getting along with others)

_____ d. intellectually

_____ e. receptive language skills (understanding of words and what is said to him)

_____ f. expressive language skills (ability to use real words or word-like sounds to tell what he wants)

2. Do you have any concerns about the way your child is growing and developing?

1---yes*
2---no

*Could you explain?

3. Considering the following characteristics, circle the number that best describes your child's . . . .

a. physical activity: (1) highly active; (2) moderately active; (3) mildly active

b. regularity (sleeping and eating): (1) regular; (2) variable; (3) irregular

c. approach (to new things): (1) accepting; (2) variable; (3) withdrawing

d. adaptability (to changes in routines): (1) adaptable; (2) variable; (3) slow to adapt

e. intensity (in expressing his feeling): (1) intense and loud; (2) variable; (3) quiet

f. distractibility: (1) easily distracted; (2) variable; (3) not so easily distracted

g. sensitivity (to noises): (1) very sensitive; (2) moderately sensitive; (3) mildly sensitive

h. mood: (1) happy & contented; (2) variable; (3) unhappy & discontented

i. persistence & attention span: (1) persistent; (2) variable; (3) not persistent

4. Have any of the above characteristics been a problem for you?

1---yes*
2---no

If yes, could you explain?

## II. WE ARE ALSO INTERESTED IN SOME OF THE THINGS YOU DO WITH YOUR CHILD:

5. How much would you say you have done in connection with taking care of your child? (circle number for each time period)

| Birth - 6 months | 7 months - present |
|---|---|
| 1---none | 1---none |
| 2---very little | 2---very little |
| 3---moderate | 3---moderate |
| 4---a good bit | 4---a good bit |
| 5---a great deal | 5---a great deal |

6. Concerning the amount of time you have been involved in your child's caretaking (feeding, dressing, diapering, etc.) have you been able to participate . . . .

| Birth - 6 months | 7 months - present |
|---|---|
| 1---a lot more than I wanted | 1---a lot more than I wanted |
| 2---more than I wanted | 2---more than I wanted |
| 3---as much as I wanted | 3---as much as I wanted |
| 4---less than I wanted | 4---less than I wanted |
| 5---a lot less than I wanted | 5---a lot less than I wanted |

Could you explain:

7. What are some of the things that you have done with your child?

| Birth - 6 months | 7 months - present |
|---|---|
| 1---diapering | 1---diapering |
| 2---feeding | 2---feeding |
| 3---bathing | 3---bathing |
| 4---playing | 4---playing |
| 5---soothe or comfort | 5---soothe or comfort |
| 6---nothing | 6---nothing |
| 7---teaching, games, walks, talking | 7---teaching, games, walks, talking |
| 8---dressing, babysit, put to bed, up at night | 8---dressing, babysit, put to bed, up at night |

8. What are some of the kinds of things you are trying to help your child learn at this time?

1---nothing
4---talking, say words
5---feeding self, drink cup
6---stand, walk
7---play with toys, games
8---personality development, character, discipline
9---other*(explain)

9. How do you teach your child about things he should not touch, or places he should not go?

1---say "no-no"
2---slap hands
3---remove objects
4---remove child
5---distraction
6---spank
7---other (explain)

10. Which of the above (No. 9) seems to work the best for you? (Indicate number) _________

11. What are some of the areas in which you and your wife disagree in regard to discipline and childrearing for your child?

12. What are some of the ways in which you feel you have influenced your child?

1---through play
2---discipline
3---love, affection
4---male role (father figure)
5---none
6---other (explain)

III. NOW SOME QUESTIONS ABOUT YOUR VIEWS OF FATHERHOOD AND WHAT IT HAS BEEN LIKE FOR YOU:

13. What do you feel is the most important role of being a father?

1---financial support
2---companionship
3---provide opportunities for education
4---teaching; values, discipline
5---emotional support of child's mother
6---sex role identification
7---other (explain)

Comments, if any:

14. Are you satisfied with your role as a father? Do you find your role to be:

1---very satisfying
2---somewhat satisfying
3---moderately satisfying
4---somewhat dissatisfying
5---very dissatisfying

Comments, if any:

15. What do you enjoy the most about being a father?

16. What is the hardest part about being a father?

17. To what extent did the birth of your child interrupt or cancel your future plans in relation to your career, employment, education?

1---not at all
2---very little
3---moderate amount
4---a good bit
5---a great deal

Comments, if any:

18. To what extent has your child influenced or changed your life style and/or home environment?

1---not at all
2---very little
3---moderate amount
4---a good bit
5---a great deal

If changed, in what way?

19. To what extent has motherhood changed or influenced your wife?

1---not at all
2---very little
3---moderate amount
4---a good bit
5---a great deal

In what way?

20. At this time how do you feel about being a father?

1---very good, a pleasant experience
2---neither pleasant nor unpleasant experience
3---variable; sometimes pleasant, sometimes unpleasant
4---unpleasant or depressing
5---other (explain)

21. What are your primary concerns at the present time?

IV. NOW THINKING ABOUT YOUR CHILD'S FUTURE:

22. How do you think your child will do in school?

1---much above average
2---above average
3---average
4---below average
5---much below average

Comments, if any:

23. How far do you think your child will go in school?

1---below high school
2---complete high school
3---complete business or trade school
4---complete 1-2 yrs. college
5---complete college
6---beyond college (explain) ______________________________
7---other (explain) ____________________________________

V. IN CONCLUSION:

24. Is there anything else about yourself, wife, child, or home that you feel would be important for us to know in learning more about children during their first year of life?

1---yes*
2---no

*Could you explain

25. How did you feel about having your wife and child participate in the Nursing Child Assessment Project?

26. If you were to help plan or design a study to learn more about fathers and their children, what would you suggest?

27. As your child gets older, would you be interested in continuing to share your observations and comments with us?

1---yes
2---no
3---maybe

Comments:

Date Completed ______________________________
Month Day Year

## APPENDIX 5.14

## FREQUENCY DISTRIBUTION OF FATHER QUESTIONNAIRE

| | N | % |
|---|---|---|
| **Sex of Infant** | | |
| Female | 61 | 50.4 |
| Male | 60 | 49.6 |
| **Race** | | |
| White | 111 | 91.7 |
| Black | 3 | 2.5 |
| Other | 5 | 4.1 |
| Did not answer | 2 | 1.6 |
| **Education Level** | | |
| **Years** | | |
| 5 | 1 | .8 |
| 11 | 1 | .8 |
| 12 | 26 | 21.5 |
| 13 | 10 | 8.3 |
| 14 | 14 | 11.6 |
| 15 | 3 | 2.5 |
| 16 | 20 | 16.5 |
| 17 | 16 | 13.2 |
| 18 | 13 | 10.7 |
| 19 | 9 | 7.4 |
| 20 | 2 | 1.7 |
| 21 | 3 | 2.5 |
| 22 | 2 | 1.7 |
| 29 | 1 | .8 |

1. **Child's Development**

| | Physical N | Physical % | Self Help N | Self Help % | Social N | Social % |
|---|---|---|---|---|---|---|
| Much above | 15 | 12.4 | 14 | 11.6 | 28 | 23.1 |
| Above | 48 | 39.7 | 44 | 36.4 | 47 | 38.8 |
| Average | 56 | 46.3 | 61 | 50.4 | 42 | 34.7 |
| Below | 1 | .8 | 0 | 0 | 3 | 2.5 |
| Much below | 1 | .8 | 0 | 0 | 0 | 0 |
| Did not answer | 0 | 0 | 2 | 1.7 | 1 | .8 |

| | Intellectual N | Intellectual % | Receptive Language N | Receptive Language % | Expressive Language N | Expressive Language % |
|---|---|---|---|---|---|---|
| Much above | 20 | 16.5 | 22 | 18.2 | 9 | 7.4 |
| Above | 59 | 48.8 | 50 | 41.3 | 26 | 21.5 |
| Average | 39 | 32.2 | 45 | 37.2 | 70 | 57.9 |
| Below | 0 | 0 | 1 | .8 | 12 | 9.9 |
| Much below | 0 | 0 | 0 | 0 | 0 | 0 |
| Did not answer | 3 | 2.5 | 3 | 2.5 | 4 | 3.3 |

2. **Concerns Re: Development**

| | N | % |
|---|---|---|
| Yes | 18 | 14.9% |
| No | 100 | 82.6 |
| Did not answer | 3 | 2.5 |

| Area of Concern | First Concern N | First Concern % | Second Concern N | Second Concern % |
|---|---|---|---|---|
| Physical | 10 | 8.3% | 0 | 0 |
| Expressive Language | 1 | .8 | 1 | .8 |
| Receptive Language | 6 | 5.0 | 0 | 0 |
| No concern | 104 | 86.0 | 120 | 99.2 |

3. **Child's Temperament**

| Physical Activity | N | % |
|---|---|---|
| High | 76 | 62.8% |
| Moderate | 42 | 34.7 |
| Mild | 2 | 1.7 |
| Did not answer | 1 | .8 |

| Regularity | N | % |
|---|---|---|
| Regular | 84 | 69.4% |
| Variable | 31 | 25.6 |
| Irregular | 6 | 5.0 |

## Appendix 5.14--Frequency Distribution of Father Questionnaire--page 2

### Child's Temperament (cont'd)

#### Approach

| | | |
|---|---|---|
| Accept | 91 | 75.2% |
| Variable | 30 | 24.8 |

#### Adaptability

| | | |
|---|---|---|
| Adaptable | 77 | 63.6% |
| Variable | 37 | 30.6 |
| Slow | 6 | 5.0 |
| Did not answer | 1 | .8 |

#### Intensity

| | | |
|---|---|---|
| Intense | 63 | 52.1% |
| Variable | 57 | 47.1 |
| Quiet | 1 | .8 |

#### Distractibility

| | | |
|---|---|---|
| Easily | 12 | 9.9% |
| Variable | 77 | 63.6 |
| Not distracted | 30 | 24.8 |
| Did not answer | 2 | 1.7 |

#### Sensitivity

| | | |
|---|---|---|
| Very | 30 | 24.8% |
| Moderate | 66 | 54.5 |
| Mild | 25 | 20.7 |

#### Mood

| | | |
|---|---|---|
| Happy | 94 | 77.7% |
| Variable | 26 | 21.5 |
| Did not answer | 1 | .8 |

#### Persistence

| | | |
|---|---|---|
| Persistent | 64 | 52.9% |
| Variable | 54 | 44.6 |
| Not persistent | 2 | 1.7 |
| Did not answer | 1 | .8 |

### 4. Temperament Concerns

| | | |
|---|---|---|
| Yes | 25 | 20.7% |
| No | 94 | 77.7 |
| Did not answer | 2 | 1.7 |

#### Area of Concern

| | | |
|---|---|---|
| Physical activity | 4 | 3.3% |
| Regularity | 11 | 9.1 |
| Adaptability | 1 | .8 |
| Intensity | 4 | 3.3 |
| Mood | 3 | 2.5 |
| No concerns | 98 | 81.0 |
| Persistence | 0 | 0 |

### 8. Teaching

| | Talk | | Feed | | Stand | |
|---|---|---|---|---|---|---|
| No | 24 | 19.8% | 14 | 11.6% | 9 | 7.4% |
| Yes | 97 | 80.2 | 107 | 88.4 | 112 | 92.6 |

| | Play | | Personality | | Other | |
|---|---|---|---|---|---|---|
| No | 91 | 75.2% | 82 | 67.8% | 117 | 96.7% |
| Yes | 30 | 24.8 | 39 | 32.2 | 4 | 3.3 |

### 9. Discipline

| | No No | | Slap Hands | | Remove Objects | |
|---|---|---|---|---|---|---|
| No | 7 | 5.8% | 63 | 52.1% | 59 | 48.8% |
| Yes | 114 | 94.2 | 58 | 47.9 | 62 | 51.2 |

| | Remove Child | | Distraction | | Spank | |
|---|---|---|---|---|---|---|
| No | 59 | 48.8% | 58 | 47.9% | 91 | 75.2% |
| Yes | 62 | 51.2 | 63 | 52.1 | 30 | 24.8 |

### 10. Best Discipline

| | | |
|---|---|---|
| No No | 21 | 17.4% |
| Slap | 3 | 2.5 |
| Remove Objects | 8 | 6.6 |
| Remove child | 5 | 4.1 |
| Distraction | 4 | 3.3 |
| Spank | 2 | 1.7 |
| Other | 1 | .8 |
| Did not answer | 77 | 63.6 |

### 11. Father-Mother Disagreements Re: Childrearing and Discipline

| | | |
|---|---|---|
| I don't give in | 6 | 5.0% |
| Degree of | 3 | 2.5 |
| Grandparents | 1 | .8 |
| Type | 1 | .8 |
| Wife not give in | 1 | .8 |
| Toy clutter | 1 | .8 |
| Did not answer | 98 | 80.9 |

## Appendix 5.14--Frequency Distribution of Father Questionnaire--page 3

12. Father's Influence on Child

| | Play | | Discipline | | Love | |
|---|---|---|---|---|---|---|
| No | 18 | 14.9% | 41 | 33.9% | 5 | 5.0% |
| Yes | 103 | 85.1 | 80 | 66.1 | 115 | 95.0 |

| | Male Role | | Other | |
|---|---|---|---|---|
| No | 56 | 46.3% | 112 | 92.6% |
| Yes | 65 | 53.7 | 9 | 7.4 |

13. Most Important Role of Father

| | Financial | | Companionship | | Education | |
|---|---|---|---|---|---|---|
| No | 95 | 78.5% | 67 | 55.4% | 102 | 84.3% |
| Yes | 26 | 21.5 | 54 | 44.6 | 19 | 15.7 |

| | Teaching | | Support Wife | | Sex Identification | |
|---|---|---|---|---|---|---|
| No | 39 | 32.2% | 85 | 70.2% | 103 | 85.1 |
| Yes | 82 | 67.8 | 36 | 29.8 | 18 | 14.9 |

| | Other | |
|---|---|---|
| No | 109 | 90.1% |
| Yes | 12 | 9.9 |

14. Satisfied with Father Role

| | | |
|---|---|---|
| Very satisfied | 98 | 81.0% |
| Somewhat | 15 | 12.4 |
| Moderate | 3 | 2.5 |
| Somewhat dissatisfied | 2 | 1.7 |
| Did not answer | 3 | 2.5 |

15. Enjoy About Fatherhood

| | | |
|---|---|---|
| Pride | 41 | 33.9% |
| Obs. actions | 47 | 38.9 |
| Satisfaction | 2 | 1.7 |
| Participation | 3 | 2.5 |
| Playing | 30 | 24.8 |
| Getting away | 2 | 1.6 |
| Challenge | 3 | 2.5 |
| Did not answer | 13 | 10.7 |

16. Hardest Part Fatherhood

| | | |
|---|---|---|
| Enough time | 13 | 10.7% |
| Patience | 35 | 28.9 |
| Tied down | 9 | 7.4 |
| Responsibility | 17 | 14.1 |
| General concerns | 6 | 5.0 |
| Character Development | 4 | 3.4 |
| Time to relax | 13 | 10.8 |
| Can't communicate | 5 | 4.1 |
| Support of wife | 3 | 2.5 |
| Did not answer | 28 | 23.1 |

17. Interruption of Plans

| | | |
|---|---|---|
| None | 82 | 67.8% |
| Very little | 19 | 15.7 |
| Moderate | 12 | 9.9 |
| Good bit | 5 | 4.1 |
| Great deal | 1 | .8 |
| Did not answer | 2 | 1.7 |

18. Extent Child Influenced or Changed Life

| | | |
|---|---|---|
| None | 7 | 5.8% |
| Very little | 20 | 16.5 |
| Moderate | 42 | 34.7 |
| Good bit | 30 | 24.8 |
| Great deal | 21 | 17.4 |
| Did not answer | 1 | .8 |

19. Extent Motherhood Changed Wife

| | | |
|---|---|---|
| None | 6 | 5.0% |
| Little | 19 | 15.7 |
| Moderate | 35 | 28.9 |
| Good bit | 32 | 26.4 |
| Great deal | 22 | 18.2 |
| Did not answer | 7 | 5.8 |

Appendix 5.14--Frequency Distribution of Father Questionnaire--page 4

20. Feelings About Fatherhood

| | | |
|---|---|---|
| Very good | 52 | 43.0% |
| Neutral | 48 | 39.7 |
| Variable | 9 | 7.4 |
| Did not answer | 12 | 9.9 |

21. Primary Concern

| | | |
|---|---|---|
| Child related | 41 | 33.9% |
| Non child related | 30 | 24.8 |
| Both | 18 | 14.9 |
| Did not answer | 32 | 26.4 |

22. Child Will Do in School

| | | |
|---|---|---|
| Much above | 26 | 21.5% |
| Above | 70 | 57.9 |
| Average | 20 | 16.5 |
| Did not answer | 5 | 4.1 |

23. How Far In School

| | | |
|---|---|---|
| Complete H. S. | 17 | 14.0% |
| Trade School | 4 | 3.3 |
| 1 - 2 Yrs. college | 14 | 11.6 |
| Complete college | 55 | 45.5 |
| Beyond college | 10 | 8.3 |
| Other | 12 | 9.9 |
| Did not answer | 9 | 7.4 |

24. What Important to Study

| | | |
|---|---|---|
| Humor | 1 | .8% |
| Parents' Love | 2 | 1.7 |
| Other children | 1 | .8 |
| Parents' age | 4 | 3.3 |
| Time with Child | 4 | 3.3 |
| Parent Relationship | 3 | 2.5 |
| Pets | 1 | .8 |
| What Dad offers | 2 | 1.7 |
| Other | 9 | 7.4 |
| Did not answer | 94 | 77.7 |

25. Feelings about Study

| | | |
|---|---|---|
| Positive | 100 | 82.6% |
| Neutral | 5 | 4.1 |
| Negative | 4 | 3.3 |
| Did not answer | 12 | 9.9 |

26. Suggestions for Father Study

| | | |
|---|---|---|
| More detail | 1 | .8% |
| Father-Infant interaction | 9 | 7.4 |
| Father's background, goals | 12 | 9.9 |
| Mother-Father relationship | 4 | 3.3 |
| Discipline | 2 | 1.7 |
| Stereotype to male role in child rearing | 2 | 1.7 |
| More emphasis on father | 16 | 13.2 |
| Other | 9 | 7.4 |
| Did not answer | 66 | 54.5 |

27. Continue in Study

| | | |
|---|---|---|
| Yes | 98 | 81.0% |
| Maybe | 22 | 18.2 |
| Did not answer | 1 | .8 |

Father's Age

| | | |
|---|---|---|
| 20 | 1 | .8% |
| 21 | 3 | 2.5 |
| 22 | 3 | 2.5 |
| 23 | 1 | .8 |
| 24 | 3 | 2.5 |
| 25 | 7 | 5.8 |
| 26 | 19 | 15.7 |
| 27 | 15 | 12.4 |
| 28 | 16 | 13.2 |
| 29 | 6 | 5.0 |
| 30 | 14 | 11.6 |
| 31 | 13 | 10.7 |
| 32 | 4 | 3.3 |
| 33 | 4 | 3.3 |
| 34 | 1 | .8 |
| 35 | 3 | 2.5 |
| 36 | 5 | 4.1 |
| 39 | 1 | .8 |
| Missing | 2 | 1.7 |

## CHAPTER 6

## INSTRUMENTATION AND FINDINGS: LIFE CHANGE

### Overview

The topic of this chapter is the background of events or life change occurring in the family, specifically for the mother, which might have health and developmental consequences. In recent years attention has become increasingly focused on sources of illness other than biological pathogens. This literature, which often uses terms such as "stress" or "stressors," links physiological processes to increased susceptibility. While being in general agreement, our focus is a bit broader in this project context.

We consider adaptation, along with coping energy to meet changing circumstances, a central concept in maintaining health. Some change in living patterns can be expected for parents with pregnancy, birth, and the unaccustomed presence of a child to rear. In addition, there are other ongoing influences such as employment, schooling, interaction with relatives, social activities, and finances, which can change and thereby call for adaptation. It can be anticipated, on the basis of existing evidence, that the greater the number of these changes or "life events," the greater the probability of negative health effects for those experiencing them. We wish to see, in addition, whether the children of parents undergoing high life change are affected. There are several potential [illegible] which this could occur.

First, the physical health of the mother and child are closely linked during pregnancy. Negative health effects for the mother can be physiologically transferred to the fetus. Schwartz (1973) found higher amounts of prenatal life change for mothers delivering premature infants than for those with full-term babies. The findings of Kruckemeyer (1975) suggest the same type of relationship for stillborn infants. Another study showed prenatal maternal life changes were associated not with prematurity but with medical complications, many of which lead to early delivery (Williams et al., 1975).

Building on the previously established importance of the environment, it is logical to expect that children may also be affected in social, emotional, and behavioral ways. When the mother's energies are directed to coping with many events she may not have as much attention for interaction with the child, or her mood when doing so may be less positive. Perhaps she will also have fewer resources to bring to bear on such routine care processes as feeding and comforting.

In order to test such relationships and examine their usefulness for child screening/assessment, provision was made to include a measure of the life events of the mother.

## Instrumentation

The Social Readjustment Rating Scale was developed at the University of Washington School of Medicine, Department of Psychiatry, based on work begun in 1949 (Holmes and Rahe, 1967). The choice of this method seemed advantageous in many ways. Terms such as "life events," "life change," "amount of change," and "saliency of events" have come directly from the conceptualization and findings of those who developed this scale. They set out to devise a way to quantify life events which required individual adaptation and adjustment. Their approach included events which could be considered both positive and negative, since the former also require adaptation. "The emphasis is on change from the existing steady state and not on psychological meaning, emotion,

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or social desirability" (Holmes and Rahe, 1967, p. 217). The goal was to find a method for quantifying life change which would go beyond counting the number of events which the individual experienced; Holmes, Rahe, and their colleagues wanted to find a way to quantify the magnitude and hence the impact of different events.

A list of more than 40 life events was constructed (the "Schedule of Recent Experience" or "SRE"), including some which would be indicative of the individual's life style and some indicative of occurrences involving the individual. The items dealt with family constellation, marriage, occupation, economics, residence, group and peer relations, education, religion, recreation, and health. Different samples were then asked to assign weights to the items based on the average degree of readjustment they required. An anchor weight was given to one item as a reference point. This was first done with an American sample. Rankings of the assigned weights correlated highly across sex, age, race, and religious groups. Subsequently extensive replication was done with other cultural groups and, while some items showed distinct logical differences, overall, there has been consistently high correlations with the original weights (e.g., Masuda and Holmes, 1967; Harmon et al., 1970).

The resulting Social Readjustment Rating Scale (SRRS) has found wide application in the health field. It has repeatedly shown that the number of Life Change Units (the summed weights for the events checked by the individual) is related to the onset of illness as well as to the severity of illness (Holmes and Masuda, 1970). This has led to its use in nursing research in order to identify those who may require supportive care because of their high risk status (Pesznecker and McNeil, 1975; Andersen and Pleticka, 1974).

Table 6.1 shows the SRE items and weights as they were used in this study.

## TABLE 6.1

## SOCIAL READJUSTMENT RATING SCALE

| Item | Weight |
|---|---|
| 1. Marriage | 50 |
| 2. Trouble with boss | 23 |
| 3. Detention in jail or other institution | 63 |
| 4. Death of spouse | 100 |
| 5. Major change in sleeping habits | 16 |
| 6. Death of close family member | 63 |
| 7. Major change in eating habits | 15 |
| 8. Foreclosure of mortgage or loan | 30 |
| 9. Revision of personal habits | 24 |
| 10. Death of close friend | 37 |
| 11. Minor violations of the law | 11 |
| 12. Outstanding personal achievement | 28 |
| 13. Pregnancy | 40 |
| 14. Minor change in health or behavior of family member | 44 |
| 15. Sexual difficulties | 39 |
| 16. In-law troubles | 29 |
| 17. Change in family get-togethers | 15 |
| 18. Change in financial state | 38 |
| 19. New family member | 39 |
| 20. Change in address or residence | 20 |
| 21. Son or daughter leaving home | 29 |
| 22. Marital separation | 65 |
| 23. Change in church activities | 19 |
| 24. Marital reconciliation | 45 |
| 25. Being fired | 47 |
| 26. Divorce | 73 |
| 27. Changing line of work | 36 |
| 28. Change in arguments with spouse | 35 |
| 29. Change in responsibilities at work | 29 |
| 30. Beginning or ceasing work | 26 |
| 31. Change in working hours or conditions | 20 |
| 32. Change in recreation | 19 |
| 33. Taking mortgage greater than $10,000 | 31 |
| 34. Taking loan less than $10,000 | 17 |
| 35. Major personal injury or illness | 53 |
| 36. Major business readjustment | 39 |
| 37. Change in social activities | 18 |
| 38. Change in living conditions | 25 |
| 39. Retirement | 45 |
| 40. Vacation | 13 |
| 41. Changing schools | 20 |
| 42. Beginning or ceasing formal schooling | 26 |

The weights per item range from 11 for minor violations of the law, such as a traffic ticket, to 100 for the death of a spouse. Except for the prenatal form which asked the mothers to check items for several past periods, they were in each case requested to check the events which had occurred since the last contact.

Table 6.2 shows the times at which the SRE was administered and the corresponding period being recalled. This table is self-explanatory except for the third trimester of pregnancy; this information was gathered in the hospital after delivery and contains events surrounding birth. The tables containing findings, therefore, are labelled "newborn" to remind the reader that this period contains both third trimester and newborn events.

The total score of the weighted items was chosen for coding in order to make comparisons with the majority of other study reports. Alternatively, the number of life changes reported at each period could have been used to assign a score. In order to see whether different results would be obtained if number of life changes were used rather than life change units and to examine the effect of duplicated reporting across periods, a small sample of subjects' responses were coded by item. Starting with a random number, we pulled every seventh subject file. If all data contacts were not complete, we used the next file. This resulted in N = 27. LCU scores and number of life changes were calculated with and without items duplicating a previous report. Since we were considering adding together the scores through delivery and adding those from 1 month through 12 months, duplication was defined as: repetition of an item in the period "the year before pregnancy" through the "newborn" period or repetition from "1 month" through "12 months." Thus, by definition the year before pregnancy and 1 month scores have no duplications.

## TABLE 6.2

## TIME OF MEASUREMENT WITH SRE

| | Period Recalled | Length of Period (months) | Time of Report |
|---|---|---|---|
| 1) | Year before pregnancy | 12 | Last trimester of pregnancy |
| 2) | First trimester of pregnancy | 3 | Last trimester of pregnancy |
| 3) | Second trimester of pregnancy | 3 | Last trimester of pregnancy |
| 4) | Third trimester of pregnancy and delivery | 3 | Two days after birth |
| 5) | First month after birth | 1 | One month after birth |
| 6) | Second, third and fourth month after birth | 3 | Four months after birth |
| 7) | Fifth through eighth month after birth | 4 | Eight months after birth |
| 8) | Ninth through twelfth month after birth | 4 | Twelve months after birth |

Table 6.3 shows the correlations in column 1 between the Life Change Scores and the Number of Life Changes. The Pearson coefficients range from .87 to .97. This finding has implications to facilitate the use of this instrument in a service setting. Scores are much harder to calculate than counting the number of items checked. The latter would be less time consuming; yet it apparently obtains the same information.

Column 2 of Table 6.3 shows the correlations between the scores as coded and the scores when duplicates are removed. These range from .83 to .99 and are generally lower for 4 to 12 months. Column 3 shows that by 12 months more than one-half of the events reported had been reported in earlier contacts during the first year of life. The whole matter of the meaning of duplicated reporting is complex. Casey et al. (1967) found that item repetition over time was highly correlated with the saliency or the weight of the item. Perhaps repetition is an indicator of perceived changes and required adaptation rather than of spurious scores as one might automatically assume. The amount of duplication found here does, however, raise questions about the benefit of repeating this assessment over short time periods. This must also be said with some qualification though; some of the most often duplicated items such as those referring to life style, e.g., sleeping and eating habits, could logically change multiple times across short periods. The whole issue clearly needs further study, including the correlates of duplicate life change reporting. These data suggest that the mothers with less education repeated oftener; however, the N is not large enough for a definitive interpretation.

Other interesting insights resulted from examination of these 27 subjects by life change item. There were few in this sample who experienced dire events

## TABLE 6.3

## PEARSON CORRELATION COEFFICIENTS FOR LIFE CHANGE SCORES AND NUMBER OF LIFE CHANGES AND PERCENT DUPLICATION

(Random Sample of 27 Subjects)

| | Number of Life Changes | Unduplicated Score | Percent of reported events which were duplicates |
|---|---|---|---|
| **Life Change Scores** | | | |
| 1. Year before pregnancy | .96 | | |
| 2. 1st trimester | .87 | .99 | 6 |
| 3. 2nd trimester | .91 | .84 | 20 |
| 4. Newborn | .97 | .95 | 25 |
| 5. 1 month | .96 | | |
| 6. 4 months | .96 | .85 | 34 |
| 7. 8 months | .92 | .89 | 44 |
| 8. 12 months | .96 | .83 | 57 |
| Total AP Score (1-4) | .93 | .94 | |
| Total PP Score (5-8) | .97 | .92 | |
| **Number of Life Changes** | | | |
| 1. Year before pregnancy | | | |
| 2. 1st trimester | | .84 | |
| 3. 2nd trimester | | .96 | |
| 4. Newborn | | .93 | |
| 5. 1 month | | | |
| 6. 4 months | | .85 | |
| 7. 8 months | | .80 | |
| 8. 12 months | | .76 | |
| Total AP Number (1-4) | | .95 | |
| Total PP Number (5-8) | | .94 | |

such as death of a family member, illness, a jail term, etc. Rather, the scores resulted from clusters of lower weighted items, and many of these were logical. With pregnancy come changes in sleeping, eating, employment, or working hours, and types of recreation. When bringing a new baby home one might anticipate changes in the number of family get-togethers and in social activities. For primiparous couples one could also expect a change in address, in financial state, and taking on a mortgage.

The perceptual nature of the SRE was emphasized when certain items were examined. Certain changes "should" have occurred for all mothers in the sample. Only 10 of the 27 checked "pregnancy" as having happened to them. Nineteen checked "gaining a new family member." During the prenatal period six checked "revision of personal habits, e.g., dress" as did nine in the postpartum period. Validity is an elusive quality for this instrument, and, since it is a projective tool, validity perhaps has meaning only in a predictive sense.

We had some hunches about why some mothers reported pregnancy as a life event while others did not. We thought that if the pregnancy was a surprise rather than a planned event and if it was viewed as an interruption of other activities, such as school or work, then it would more likely be reported. This was not true, however; there were no associations between these factors and reporting pregnancy. Neither did perinatal risk nor physical complications of pregnancy show any relationships with reporting this life event. Although not statistically significant in this small subsample, there was an association between the subjects' feelings about being pregnant and reporting pregnancy on the SRE. Fewer mothers who were "delighted in every way" during the last trimester checked pregnancy compared to those who had mixed feelings or some reservations about their situation. This is consistent with the intent of the SRE to elicit the perceived magnitude of circumstances with which respondents have to cope.

Findings

The descriptive statistics on the SRE for the total sample are contained in Table 6.4. None of the distributions is normal, in that there is a general tendency toward grouping at score zero and skewing to the right. Interestingly, the ranges and average scores do not differ according to the length of the reporting period; they are very similar throughout.

The life change scores for our sample are lower than one would expect to find using this instrument. Table 6.5 illustrates this through comparison with the findings of another study by Williams et al. (1975). Their sample contained 46 women from the Seattle area who had recently given birth to premature or full-term babies. The characteristics of the sample were very similar to ours yet they reported much higher mean scores.

In another study of Seattle maternity patients, Schwartz (1973) found a six percent rate of major life change (a score of 300 or more) in the year prior to pregnancy. Our comparable rate was two percent. When interpreting the SRE data and its predictive value from this project, it is important to remember that the score levels reported are atypically low. They are especially low compared to high-risk maternity populations such as Schwartz studied, in which life changes of greater magnitude typically occur. Further study will be needed to test the potential assessment value of this tool for child health and development in these high-risk populations.

Consistency of SRE Scores Over Time. Table 6.6 shows the correlations between scores at the different study periods. The highest coefficients (.20 - .36) cluster between 1 and 12 months. This is probably at least partially due to the repetitive reporting during this period as shown by the

## TABLE 6.4

## DESCRIPTIVE STATISTICS FOR THE SRE

| | N | Percentile | | | Range of Actual Score Values | Mean | S.D. |
|---|---|---|---|---|---|---|---|
| | | 25th | 50th | 75th | | | |
| Year before pregnancy | 188 | 0 | 50 | 103 | 0-385 | 70.9 | 76.9 |
| 1st trimester | 188 | 16 | 54 | 90 | 0-327 | 62.0 | 58.2 |
| 2nd trimester | 188 | 15 | 49 | 111 | 0-421 | 69.0 | 69.9 |
| Newborn | 184 | 31 | 64 | 113 | 0-510 | 83.2 | 80.7 |
| 1 month | 187 | 31 | 69 | 107 | 0-395 | 78.8 | 64.4 |
| 4 months | 179 | 18 | 57 | 107 | 0-396 | 76.2 | 76.6 |
| 8 months | 167 | 20 | 57 | 115 | 0-384 | 79.2 | 78.1 |
| 12 months | 173 | 26 | 63 | 109 | 0-497 | 78.6 | 75.6 |

## TABLE 6.5

## MEAN LIFE CHANGE SCORES COMPARED WITH WILLIAMS ET AL. (1975)

| Time Period | Williams et al. | | Our Sample |
|---|---|---|---|
| | Premature | Full-term | |
| Year prior to conception | 207.52 | 260.57 | 70.91 |
| Pregnancy | 352.61 | 360.35 | 212.38 |

TABLE 6.6

KENDALL CORRELATIONS BETWEEN SRE SCORES

| | 1st tri. | 2nd tri. | New-born | 1 mo. | 4 mo. | 8 mo. | 12 mo. |
|---|---|---|---|---|---|---|---|
| Year before pregnancy | .13* | .06 | .13* | .08 | .02 | .13* | .08 |
| 1st trimester | | .25* | .16* | .11* | .00 | .15* | .11* |
| 2nd trimester | | | .11* | .09* | -.02 | .15* | .10* |
| Newborn | | | | .16* | .18* | .23* | .15* |
| 1 month | | | | | .24* | .24* | .20* |
| 4 months | | | | | | .30* | .23* |
| 8 months | | | | | | | .36* |

* $p < .05$
N ranges from 160 to 188.

subsample analysis. Correlations for the prenatal period show some consistency over time, but are not as strong. Interestingly, the 8-month score is significantly related to the scores for all preceding periods. From the general size of the correlations one must conclude that, at least in their present form, early life change reports are not interchangeable with later ones. That is, prenatal scores are not particularly good predictors of those during the period of infancy, and those early in infancy are only fair reflections of later time points during the first year.

*Relationships with Education and Income*. Kendall correlations between mother's years of schooling and the SRRS scores showed that mothers with more education reported life changes of greater magnitude for the year before pregnancy (Table 6.7). Later in their infants' first year of life, however, the direction of this relationship changed; mothers with less schooling reported more life change. Similarly, mothers of high income families reported lower change scores during the latter part of the year.

*Relationships with Health*. We had hypothesized that the magnitude of life change experienced by our study mothers prior to the birth of their children would be positively related to birth complications and to deviant newborn behaviors. There was some association between the life change score of the second trimester and the total deviant Brazelton score (tau = .09, p = .03), but in general, the expected relationships were not found, i.e., with neurological signs, gestational age, minor anomalies, or perinatal risk scores. These findings may well be due to the general health and low life change of our sample; they in no way preclude further investigation of similar relationships in more diverse groups and in groups at higher risk of complications.

The lack of relationships between prenatal life change and the outcomes

## TABLE 6.7

## KENDALL CORRELATIONS FOR SRE SCORES YEARS OF SCHOOLING, AND INCOME

| SRE Score | Mother's Years of Schooling | Income at age 12 months |
|---|---|---|
| Year before pregnancy | .14* | .07 |
| First trimester | .03 | -.01 |
| Second trimester | -.04 | -.09* |
| Newborn | -.02 | -.05 |
| 1 month | -.04 | -.08 |
| 4 months | -.12* | -.08 |
| 8 months | .01 | -.20* |
| 12 months | -.05 | -.11* |

* $p < .05$
N ranges from 158 to 188

of pregnancy may also result from the way we looked for them. There is no reason to believe there would be any strong specificity of neonatal response to environmental stressors such as maternal life change. As Cassel (1974) argued, there is more likely to be diverse health responses to general social stimuli; the specific problems which result likely depend on the physical, genetic, and other characteristics which combine as etiological forces. Following this idea, future analyses will examine the relationship between life change and alternative outcomes considered in combination, i.e., deviant neurological findings, perinatal complications, or unusual Brazelton behaviors.

As a result of earlier studies we also expected relationships between the magnitude of life change and the mother's health status. Table 6.8 shows the relationships between earlier life change scores and the mothers' ratings of their own health at 4 and 8 months. Though small, these correlations indicate that mothers with more life change rated their health as poorer.

High life change mothers also reported that their children had more illnesses during infancy and they utilized the Group Health clinic facilities more frequently for treatment of their babies' sicknesses (Table 6.9). It occurred to us that these relationships could stem from varying maternal perceptions or definitions of child illness which might differ depending on the life events with which the mothers had to cope. There is some suggestion that this might be so (Table 6.10). Although mothers with high life change reported more infant illness and used the clinic more, their children's regular physicians were not concerned about their physical health at the 1 year examination.[1] There were, however, significant associations between the mothers' life change scores early in infancy and the physicians' concerns

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[1] The source of physician concern variables is explained in Chapter 7.

## TABLE 6.8

### KENDALL CORRELATIONS BETWEEN SRE SCORES AND MOTHER'S HEALTH

| Time of SRE Score | Time of Mother's Health Rating[1] | |
|---|---|---|
| | 4 mos. | 8 mos. |
| Year before pregnancy | .05 | .11* |
| 1st trimester | .01 | .14* |
| 2nd trimester | .04 | .16* |
| Newborn | .11* | .15* |
| 1 month | .09* | .04 |
| 4 months | .13* | .05 |
| 8 months | -- | .12* |

*$p < .05$, N ranges from 154 to 160.

[1] Higher ratings indicate poorer health.

## TABLE 6.9

### KENDALL CORRELATIONS BETWEEN LIFE CHANGE SCORES AND INFANT ILLNESS AND CLINIC UTILIZATION

| | Total illness reported during 1st year | Number of clinic visits for illness during 1st year |
|---|---|---|
| 1st trimester | .15* | .12* |
| 2nd trimester | .05 | .01 |
| Newborn | .16* | .14* |
| 1 month | .11* | .04 |
| 4 months | .04 | .12* |
| 8 months | .12* | .17* |
| 12 months | .07 | .17* |

*$p < .05$, N ranges from 155 to 163.

## TABLE 6.10

## KENDALL CORRELATIONS BETWEEN MOTHER'S LIFE CHANGE SCORE AND PHYSICIAN'S CONCERN ABOUT THE INFANT AT ONE YEAR OF AGE

| Time of Life Change Score | Physician Concern About: The Child's Physical Health | The Child's Home Environment |
|---|---|---|
| 1st trimester | .02 | .10* |
| 2nd trimester | .07 | -.01 |
| Newborn | .02 | .14* |
| 1 month | -.01 | .10* |
| 4 months | .01 | .11* |
| 8 months | -.01 | .08 |
| 12 months | .00 | .03 |

*$p < .05$, N ranges from 145 to 150.

## TABLE 6.11

## MEAN MATERNAL SCORES BY LIFE CHANGE AND PSYCHOSOCIAL ASSETS[1]

| | Mother Types[2] | | | |
|---|---|---|---|---|
| Twelve Month Maternal Score | High Change Low Assets N=39 | High Change High Assets N=47 | Low Change Low Assets N=29 | Low Change High Assets N=57 |
| Negative Messages[3] | 1.48 | 1.29 | 1.39 | 1.35 |
| Facilitation[3] | 3.93 | 4.19 | 4.12 | 4.11 |
| Avoidance of Restriction and Punishment[4] | 5.23 | 5.64 | 5.32 | 5.51 |
| Maternal Involvement with the Child[4] | 4.86 | 4.97 | 5.63 | 5.16 |
| Adaptation[5] | 33.72 | 35.14 | 35.22 | 34.12 |
| Life Change Score | 85.18 | 82.64 | 65.63 | 46.44 |

[1] The PSA and life change scores used were for the period of pregnancy. The latter were summed.

[2] High and low is defined by the median.

[3] From the teaching interaction.

[4] From the Home Stimulation Inventory.

[5] The total feeding interaction score.

about the child's environment.

Relationships with the Home Environment and Maternal Behavior. Given that some mothers experienced more life change than others, what other aspects of the home environment might have helped them or made life even more difficult? There were essentially no significant relationships between the mothers' life event scores and the fathers' involvement in child care or the amount of parent mutuality in child rearing. At each time point, however, there was a negative correlation between the mothers' psychosocial assets and the amount of life change: the fewer assets, the more change.

The work of Nuckolls (1972) suggests that the effects of life change are best examined in combination with psychosocial assets, that the negative effects of many life changes are evident only when those experiencing them do not have adequate psychosocial supports. Thus when considering relationships between the mother's life situation and her behavior with the child, we combined these variables. Four groups were formed on the basis of life change scores and psychosocial assets. We were particularly interested in the findings for the high-change - low-asset group, expecting that they would have the most to cope with and the least support to do so, thereby decreasing their energies available for interaction with their baby. We were also interested in the effect on this group over time.

Few differences in maternal behaviors by life change and assets were found early in infancy. By 12 months, however, the expected pattern was beginning to emerge. Table 6.11 contains the mean maternal behavioral scores for the four groups of mothers classified on the basis of their life change and assets during pregnancy. The high-change - low-asset combination of these early scores seems to define a group of mothers who, 12 months later, were giving their children more negative messages, were less facilitating, were more restrictive and punishing, were observed to be less involved with their infants, and showed less adaptive behavior during feeding. They also continued to experience more life change on the average than did the other groups.

Although the differences in Table 6.11 are not large, the trends shown are consistent for the first group of mothers. They suggest that the effects of life change on parental behavior may be cumulative, being perhaps linked to the psychosocial supports available even before delivery. Future analyses will address these possibilities.

### Summary

The Schedule of Recent Experience was found to be an easy instrument to administer. Although a sound weighting system has been devised for the life events, the actual count of events produces similar relative scores and would be easier to use in service settings. Those using the SRE must be aware that it is a projective instrument designed to gather what the respondent perceives has happened, not those which an observer believes "really" happened.

Our sample of mothers reported little life change compared with other research samples. This result undoubtedly influences the associations which can be shown within our data and encourages future study of the SRE's usefulness in child health assessment in other types of populations.

The consistency of life change scores over time, using correlation techniques, was found to be moderate for this sample. When a group of mothers was identified with low psychosocial assets and high life change during pregnancy, their subsequent life change score remained higher somewhat more consistently during their children's infancy.

High life change mothers in our sample can be characterized by the following: they were relatively less educated and had less family income; they perceived their own and their babies' health as poorer than did mothers with less life change; they used clinic facilities more often for infant illness. They did not have more perinatal complications or deliver newborns with more deviant neurological signs and behaviors. This negative finding, however, must be viewed cautiously because of the relatively low life change and generally high health status of this sample.

Mothers with low psychosocial assets and high life change during pregnancy showed less positive maternal behaviors by the time their infants reached 1 year of age. This suggests a cumulative effect of impinging life events which will be examined further in subsequent analysis. It also reiterates the importance of considering other life circumstances, such as available social and psychological supports when considering the implications coping with life change have for parent behavior and the child's environment.

Based on our experience with the SRE to date we would recommend a) that number of life changes be used to score rather than the weighted SRRS values, b) that life change be evaluated in combination with the amount of support in the parental environment, c) that the highest priority time for assessing life change as it influences parenting is probably the period of pregnancy although the cumulative effect during infancy has not yet been clearly determined, and d) that other investigators join us in the effort to better understand parent life circumstances as they relate to child development.

# CHAPTER 7

# INSTRUMENTATION AND FINDINGS: 12 MONTH STATUS

The broad areas of health and development which need to be considered as outcomes in this project were discussed in Chapter 1. From the findings of other investigators we realized that 1-year developmental status would not be a discriminating criterion against which to evaluate the experiences of infancy; outcomes at older ages are required both to gain further knowledge about the causes of developmental problems and to establish the validity of assessment methods. In a longitudinal study of this nature, however, the 12-month status data do serve important descriptive purposes. The problem of dropout in prospective studies also makes it important to obtain periodic measures of developmental status, so that if study children are lost before long-term outcomes can be measured, we will have a tap on what they were like compared with those remaining in the cohort.

The methods used to determine 1-year status were chosen as the soundest available by virtue of their standardization, traditional acceptance, and/or depth of evaluation. Appendix 7.1 presents a list of the 12-month status variables along with a summary of their construction (or reduction) and descriptive statistics.

## PHYSICAL HEALTH AND GROWTH

### Instrumentation

After the subject's first birthday, study personnel contacted Group Health for access to health care records. From the record notes made during routine well-child visits several physical indicators of health were abstracted: height, weight, head circumference and hematocrit. The records also provided information on the number of visits made [illegible] the care facility during the year, and the reason for the visits. Obtaining the complete information was, of course, contingent on the child's receiving care from Group Health for the entire first year of life; for those who moved and the few who changed to other sources of care it was not available. The health care record data were obtained for 164 of the study children.

Indications of the children's physical well-being were also sought from the mothers. During the home contacts throughout the year they were asked what illnesses and accidents had occurred since the last contact. In order to get at the mothers' perceptions of the severity of the problem they were asked about the effects on the child, and the duration of the symptoms.

A physician's evaluation at 1 year of age was considered an important aspect of assessing health status. There were alternative ways of accomplishing this. We could have had all the study children examined by one project physician. We chose the alternative of getting a report from the children's regular physicians. An exam at 12 months was part of the usual care, but even more importantly, the physician who had seen the family over a period of time would know the infant better and provide a fuller picture of any problems. So a form was devised to be sent to the appropriate physicians eliciting their concerns and ratings in several specified areas: perinatal complications, physical health, development, home environment, health care practices and congenital abnormalities. Sometimes a nurse practitioner was the principal caregiver, in which case she provided the assessment. One hundred and fifty-one forms were completed and returned.

### Data Reduction and Descriptive Statistics

Measurements of height and weight at 12 months were abstracted from the Health Care Record and converted to percentile ranges for age and sex based on the normative data of Stuart and Meredith (1946) (see Barnard and Douglas, 1974, p. 126). The infants in our sample were taller and lighter than the standardization sample of Stuart and Meredith: 67.2 percent of our sample were at or above the 50th percentile for height, and 37.8 percent were at or above the 50th percentile for weight.[1]

In order to take a closer look at the growth of our infants an additional measure was devised to determine the height-weight relationship. This measure was calculated by subtracting the weight percentile category from the height percentile category resulting in the percentile line difference between height and weight. For example, a height in the 91st to 97th percentile range (category 7) and a weight in the 25th to 49th percentile range (category 4) would result in a weight-for-height score of 3 representing a weight which is 3 percentile lines (or percentile ranges) lower than the height. Eleven (6.7%) infants with weight more than three percentile ranges lower than height were considered to be deviantly low weight for height. None of the infants in our sample was considered to be deviantly overweight by the three percentile range criterion.[1]

Head circumference (OFC) measurements at 12 months were converted to standard deviation (S.D.) ranges for age and sex based on the normative data of Nellhaus (1968), (see Barnard and Douglas, 1974, p. 48). The resulting ordinal scale consisted of four categories: 1) greater than 2 S.D.s below the mean, 2) 2 S.D.s below the mean, 3) 2 S.D.s above the mean, 4) greater than 2 S.D.s above the mean. The majority of our sample (96.7%) had OFCs within ± 2 S.D.s of the Nellhaus (1968) mean (Appendix 7.2).

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[1] Distributions are in Appendix 7.2.

Hematocrit values were coded in percentages from the Health Care Record at 12 months. No further reduction was made of these data. Hematocrits were available for only 73 of the infants in our sample (44 percent of the 164 infants who were seen at the health care facility at 12 months). Using the norms provided by Frankenburg and North (1974, p. 169), all but one of the subjects in our sample showed hematocrit values above the normal minimum of 33 percent.

Three measures pertaining to utilization of the health care facility were also abstracted from the Health Care Record. Visits to the health care facility in the first year were divided into three categories: 1) well-child visits, 2) illness visits, and 3) "defect" visits. Well-child visits are regularly scheduled visits for supervision of the infant during the first year, including immunizations and measurement of growth. The recommended number is five: at 6 weeks, 3 months, 5 months, 8 months, and 12 months of age. The category of illness visits included visits for the diagnosis, treatment, and follow-up of illness as well as treatment of accident-related injuries. "Defect" visits included visits for the diagnosis, treatment, and follow-up of congenital conditions such as hernia, deformed hips, feet, etc. These visits were with the regular pediatrician, physical therapist or other specialists. This information from the Health Care Record was coded as the number of visits made in each of the three categories.[1]

The majority of the subjects in our sample (86%) had the recommended number of regular checkups. Only seven subjects (4.2%) had inadequate health care utilization (viz., three or fewer well-child visits). The number of visits for illnesses during the first year ranged from 0 to 14 with a median of about three illness visits. The majority of our sample (84.1%) did not have any "defect" visits. The number of visits for supervision or treatment of congenital conditions ranged from 0 to 23.

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[1] Frequency distributions for visits to the health care facility are presented in Appendix 7.3.

Information from the home interviews included the illnesses and accidents which had occurred since the last visit as well as their duration and effect on the infant. Illnesses were coded into seven categories: 1) allergies, 2) colds, 3) colic, 4) flu, 5) infections, 6) rashes, and 7) other.

Accidents were coded into eight categories with three divisions as to type (Barnard and Douglas, 1974, pp. 149-160):

1) blows with child active
    a. open field (e.g., crawling, walking, colliding)
    b. falls (e.g., from tables, etc.)
2) blows with child passive
    a. dropped
    b. unusual (e.g., hit by flying objects, collapsing equipment)
3) injuries other than blows
    a. bites, scratches (animals)
    b. burns
    c. ingestion (e.g., non-edibles, poisons)
    d. other (e.g., electric shock)

Illnesses and accidents were coded according to duration and effect on the child. The data on effect and duration were combined into an index of perceived severity. Severe illnesses were defined as those lasting two or more weeks and having some or much effect on the infant as rated by the mother. The majority of accidents were minor, viz., the majority of the accident-related injuries lasted one day or less (98% at 4 months, 97% at 8 months, and 96% at 12 months).

The most frequent type of illness reported at each time point was colds. Rashes ranked second in frequency of any specific type of illness at 4 and

8 months and third at 12 months. Colic ranked third in frequency at 4 months and dropped severely to rank six at 8 and 12 months. Infections were somewhat more frequent at 12 months (rank 2) than at 4 and 8 months (rank 4). At 4 months, about half (50.9%) of the cases of colic were reported as severe in terms of their duration and effect on the infant. At 8 months, a relatively high percentage of infections (30.4%) were reported as severe. At 12 months, 21 percent of the allergies and 17.3 percent of the infections were reported as severe.[1]

The most frequent type of accident at 4 and 8 months was falls.[1] Open field blows ranked first at 12 months, when infants are more mobile. At all ages most of the blow-type accidents were precipitated by activity of the child rather than by the actions of others in the environment. Number of illnesses per child during the first year range from 1 to 14 with a median of 5.2. Number of severe illnesses ranged from 0 to 9 with a median of 0.3. Number of accidents in the first year ranged from 0 to 7 with a median of 2.4 (Appendix 7.5).

A third source of physical health and growth status information was the Physician's Assessment. The principal caregivers at the health care facility rated 16 items in six major areas, as shown in Table 7.1.[2] They showed the

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[1] Frequency distributions for type and severity of illnesses and accidents at each time point (4, 8, 12 months) are presented in Appendix 7.4. It should be made clear that the figures are based on numbers reported, not number of subjects having each illness or type of accident, and that the number of cases varies at each time point. Thus exact comparisons can not be made across time points. We realize that some of the illnesses are subject to seasonal variability. The data on month of year for each illness is coded and retrievable but has not been analyzed at this time.

[2] Strictly speaking, the physician's developmental and environmental concerns do not fall under the general category of "Physical Health and Growth" but are discussed in this section for convenience, since they originated from the same source as the other physician's concerns.

## TABLE 7.1

## FREQUENCY DISTRIBUTIONS FROM PHYSICIANS' ASSESSMENT AT TWELVE MONTHS (N=151)

| Item | No Information | Good or Advanced | Normal | Suspect | Abnormal | Percent Suspect, Abnormal, or Significant |
|---|---|---|---|---|---|---|
|  | N | N | N | N | N |  |
| I Perinatal Conditions | 7 | 13 | 112 | 15 | 4 | 12.6 |
| II Physical Health | 1 | 18 | 124 | 5 | 3 | 5.3 |
| III Development |  |  |  |  |  | 2.6 |
| Motor | 0 | 20 | 129 | 1 | 1 |  |
| Mental | 0 | 18 | 132 | 1 | 0 |  |
| Language | 1 | 18 | 129 | 3 | 0 |  |
| Social-adaptive | 3 | 17 | 131 | 0 | 0 |  |
| IV Environment |  |  |  |  |  | 8.6 |
| Parent-Parent Interaction | 54 | 18 | 70 | 5 | 4 |  |
| Parent-Child Interaction | 6 | 26 | 113 | 6 | 0 |  |
| Toys | 55 | 11 | 83 | 2 | 0 |  |
| Discipline | 30 | 11 | 104 | 5 | 1 |  |
| V Health Practices |  |  |  |  |  | 9.3 |
| Well-child visits | 3 | 28 | 118 | 0 | 2 |  |
| Accident prevention | 9 | 22 | 119 | 0 | 1 |  |
| Anxieties | 2 | 8 | 135 | 5 | 1 |  |
| Follow-through | 4 | 26 | 118 | 2 | 1 |  |
| Nutrition | 3 | 20 | 120 | 8 | 0 |  |
|  | No Information | None | Minor non-significant | Minor significant | Major significant |  |
| VI Congenital Abnormalities | 5 | 119 | 18 | 7 | 2 | 6.0 |

most concern for the study children in terms of perinatal conditions. They also registered problems, however, in the other areas, especially health practices and the home environment. Most of these children are considered normal or above though by their health caretakers as evidenced by the fact that they had no concerns whatever about 72.8 percent of them.

### Relationships to Education, Perinatal Risk, and Sex

Four of the physical health and growth variables at 12 months were significantly related ($p < .05$) to mother's years of schooling:

Well-child visits (tau = .17)
Head circumference (tau = .14)
Severe illnesses (tau = .11)
Physician concerns re congenital conditions (z = 2.05).

Mothers with higher education tended to be better utilizers of the well-care provisions of the health care facility than those with lower education. Their infants had somewhat larger head sizes which may be indicative of more adequate nutrition. Maternal years of schooling also showed a small positive relationship with number of reported severe illnesses; the reason for this finding is unclear.

Maternal education was significantly higher[1] for the mothers of infants for whom the physician noted a congenital abnormality (median = 16.6 years) than in the group with no anomalies (median = 13.7 years). This finding is hard to understand unless it is due to the relationship between education and the number of visits to the clinic; mothers with higher education tended to make more clinic visits so the caretakers had more opportunity to observe the infants and to note abnormal conditions.

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[1] Mann-Whitney U Test.

*Perinatal risk*[1] was significantly related to three of the physical health and growth variables:

Total physician concerns (tau = .19)
Weight percentile (tau = .09)
Physician concerns re perinatal conditions (z = 2.47).[2]

The health caretakers tended to have more perinatal and more overall concerns about infants who had high perinatal risk scores. These findings provide some confirmation that our methods of assessing perinatal risk conditions are congruent with risk conditions noted by physicians. There is, however, obviously not perfect agreement between the physician's rating of perinatal conditions and our ranking of perinatal risk; some infants with mild to severe risk status by our scoring were not considered by the physicians to have abnormal perinatal conditions and vice versa.

While weight had a low significant correlation with perinatal risk, no significant differences in perinatal complications were found between infants of normal weight for height and those with low weight for height. Early complications also showed no association with illness or accidents during the first year of life.

*Sex* differences were found for three of the physical health and growth variables:

Weight percentile (z = 3.32)
Hematocrit (z = 2.26)
Physician concerns re perinatal conditions (chi square = 4.24).

Even though the Stuart and Meredith norms used for weight were determined for each sex separately, males were found to be relatively higher in weight percentile (median = 25th to 49th percentile) than females (median = 10th to 24th percentile). There were, however, no significant differences between males and females when looking at weight in relation to height; viz., females were not significantly more prevalent in the low weight for height group. Hematocrit values also tended to be higher for males (median = 36.98%) than for females (median = 35.64%) which is congruent with their relatively higher weights.

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[1] Perinatal Risk is defined in Chapter 3. Briefly, maternal and infant risk factors are ranked on a four-point scale from none to severe.

[2] Mann-Whitney U Test.

Sex differences were also found by perinatal conditions reported by physicians; 18.3 percent of the females had abnormal perinatal conditions noted by the physicians while only 5.8 percent of the males had such conditions noted. This finding must be a function of caretaker reporting at 1 year as no sex difference was found on perinatal risk factors documented at birth.

### Relationships among Physical Health and Growth Variables

Correlations among the physical health and growth variables are presented in Table 7.2. These correlations reflect a pattern of health care utilization and health status: infants who were taken to the health care facility for the recommended number of well-child checkups had higher hematocrits, fewer illnesses, and fewer clinic visits for illnesses. The number of well-child visits was also positively correlated with the number of suspect or abnormal conditions noted by the physician and the number of visits for management of congenital conditions. These relationships are logical; well-child care facilitates supervision of the infant's health and better detection and follow-up of problems. Also logical are the findings that mothers who reported more illnesses for their infants, more severe illness, and more accidents tended to make more visits to the health care facility for the treatment of illnesses

## TABLE 7.2

## CORRELATIONS AMONG PHYSICAL HEALTH & GROWTH VARIABLES AT 12 MONTHS

| | Health Care Record | | | | | | Maternal Interviews | | | Physician Assessment |
|---|---|---|---|---|---|---|---|---|---|---|
| | Weight Percentile | Hematocrit | Head Circumference | Well-Child Visits | Illness Visits | Defect Visits | Illnesses | Severe Illnesses | Accidents | Total Concerns |
| HEALTH CARE RECORD | | | | | | | | | | |
| Height Percentile | .43* | .05 | .11* | .00 | .08 | -.17* | -.00 | .03 | .15* | -.03 |
| Weight Percentile | | .16* | .22* | .01 | .08 | -.00 | .02 | .04 | .14* | .01 |
| Hematocrit | | | -.02 | .22* | .06 | -.08 | .07 | .18* | -.13 | .00 |
| Head Circumference | | | | .08 | -.02 | .03 | -.04 | -.06 | .02 | -.08 |
| Well Child Visits | | | | | -.11* | .17* | -.12* | .03 | -.06 | .14* |
| Illness Visits | | | | | | .01 | .33* | .27* | .13* | .06 |
| "Defect" Visits | | | | | | | .09 | .13* | .05 | .18* |
| MATERNAL INTERVIEWS | | | | | | | | | | |
| Illnesses | | | | | | | | .23* | .18* | .00 |
| Severe illnesses | | | | | | | | | -.01 | .04 |
| No. of Accidents | | | | | | | | | | -.06 |

*Kendall Correlation Coefficients; $p < .05$; Range of N = 144-164 (for correlations with hematocrit, Range of N = 65-73).

A = 55, E = 2.75, O = 20.

and accident-related injuries.

Analysis of the specific concerns noted by the health caretakers also revealed some sensible relationships. Infants whose physical health was suspect or abnormal had more visits to health care facility for the treatment of illnesses. Infants with congenital conditions reported by their health caretakers had more visits for the management of those defects. Infants for whom physicians had concerns about development had more "defect" visits. The possibility probably should be considered that these relationships between health care utilization and health caretaker concern may be at least partly due to the opportunities to observe and be aware of the children's conditions.

Of the four measures of growth status at 12 months, height, weight, and head circumference showed significant positive intercorrelations as would be expected. Hematocrit was significantly correlated with weight but not with height or head circumference.

Infants who were in the higher percentiles for height and weight tended to have more accidents. This may be related to earlier mobility in physically-advanced infants, thereby increasing the likelihood of falls and collisions with objects.

## DEVELOPMENTAL STATUS

The developmental areas evaluated at 1 year of age included language, mental, motor, and behavioral development.

### Instrumentation

The Sequenced Inventory of Communication Development (SICD) (Hedrick et al., 1975) was chosen to assess language status at 12 months because of its unique combination of qualities: it contains more language items than other tests designed for assessing several areas of development and thus allows a deeper evaluation of the language area; it depends less on parental reporting and recall and more on direct observation; it has a defined protocol for eliciting infant responses; it has been standardized for use with children 1 year of age and younger so that beginning language behaviors can be assessed according to norms.

The SICD is divided into Receptive and Expressive scales. Items in the Receptive scale measure behaviors including: 1) awareness of sound and speech (e.g., turning to localize a sound source), 2) discrimination of sound and speech (e.g., differential responses to environmental sounds or voices), and 3) understanding of speech accompanied by gesture, or situational cues, or to speech alone.

Expressive behaviors include assumed levels of progression from motor to vocal to verbal responses.

Items in the Expressive scale include: 1) imitation of previous motor or speech events, 2) initiating behaviors (motor or speech behaviors which occur without a previous verbal event), and 3) responding behaviors which follow verbal antecedent events.

The full form of the SICD was administered to the study infants at age 12 months by the psychometrist at CDMRC. A shortened version (Form H) was also administered in the home by the nurse interviewers at each contact. The two different forms were used to see whether the simpler home version offered a valid possibility for early screening.

Since our study began further work has been done to establish the quality of the SICD (Hedrick et al., 1975). The timing is advantageous in that the norms from more rigorous standardizations are available for our analysis. A total of 252 Seattle children were included to equalize representation for ages 4 months through 4 years, for males and females, and for socioeconomic status. Only Caucasian children were included. The findings have been produced in terms of the percentage passing each item by age. During the standardization, study subjects throughout the age range were examined by two raters. The interexaminer reliability ranged from 90 to 100 percent agreement with a mean of 96. When ten subjects were retested one week later, the range of reported test-retest reliability was 88 to 99 percent agreement (mean = 93%). Evidence of the test's concurrent validity comes from correlations with the Peabody Picture Vocabulary Test. For the receptive language age r = .76.

Mental and motor development were assessed by two instruments devised by Uzgiris-Hunt and Bayley. The Uzgiris-Hunt Scales of Infant Psychological Development (Uzgiris and Hunt, 1975) are composed of a series of tasks and behaviors related to Piaget's dimensions of cognitive behavior. Each scale represents a heirarchy of skills, making it possible to rate the infant's maturity or developmental level in regard to a particular dimension of cognition. In the complete form there are six scales. Only three were used in this study: the Means and Ends Scale, the Vocal Imitation Scale and the Gestural Imitation Scale. These three were chosen because earlier use by others suggests that they are especially susceptible to variations in environmental stimulation. These scales were administered by the psychometrist at CDMRC to infants at 1 year of age.

The eliciting situations in the Means and Ends Scale are directed at what infants do to cause events or obtain objects which they desire. In such situations infants combine the use of one behavior pattern as means with another as end or goal. Hand-watching activity is one of the earliest behaviors observed in the development of this concept. By 12 months infants are beginning to use some anticipatory construction of alternate means for a given end as evidenced by the infant's ability to use a string tied to an object to obtain the object which is out of reach.

The series for Vocal Imitation begins when the infant shows some differentiation of the vocalizing scheme by engaging in playful vocalizations. By 12 months most infants have progressed to a stage of recognition of familiar sound patterns as evidenced by an ability to match their own vocalizations to familiar ones. Some accommodation to novel sound patterns begins toward the end of the first year.

The Gestural Imitation series follows a similar sequence. Infants begin by imitating simple gestures which are within their behavioral repertoires. By 12 months they are able to accommodate to novel body movements by imitating novel gestures which they can see themselves perform. Later, infants progress to the imitation of unfamiliar gestures which they cannot see themselves perform, i.e., facial gestures.

The scales do not comprise an age-test; they compare children of the same age and result in ordinal data. They enable a finer, qualitative discrimination of cognitive development as compared to less sensitive, global developmental scores.

Uzgiris and Hunt (1975) reported interobserver reliability for 168 applications of their scales. The percent of agreement by item ranged from 72 to 100 with an overall mean of 96. Eighty-four infants were retested 48 hours later. The range of consistency across time was 42 to 100 percent by item with an overall mean of 80. The perspective from which these scales were developed was not to compare infants with some normative standard. Rather the ordinal results are meant to describe infants' progress on several psychological dimensions. The authors, therefore, have not undertaken a standardization study; they attribute "intrinsic validity" to their scales for the descriptive ability.

The Bayley Scales of Infant Development (BSID) (Bayley, 1969) were also administered to our sample at 1 year of age. They cover the age range from 2 to 30 months of age and include three sections: the Scale of Mental Development, the Scale of Motor Development, and the Infant Behavior Profile. These scales were chosen to establish the status for motor, mental and social-adaptive behavior because of their wide use, which permits comparisons with other findings and because of the standardization procedures used to determine their norms. The standardization sample of 1262 infants was controlled by urban-rural residence, sex, race and education of household. The split-half reliability coefficients reported for the Mental Scale range from .81 to .93. For the Motor Scale the range is .68 to .92. The Bayley Scales have been validated on 2-year-olds by comparison with the Stanford-Binet (r = .57). Interobserver tests of reliability have been done by Bayley for individual items. She found an average agreement of 89 percent on the mental scale and 93 percent on the motor scale. Test-retest agreement was somewhat lower (in the 60s) when 8-month-old children were retested at 9 months (Bayley, 1969).

The results of the Bayley Motor and Mental Scales are expressed in terms of normalized standard scores (MDI and PDI) which are amenable to both correlation analysis and to classifying scores for categorical analysis.

The Bayley Infant Behavioral Record (IBR) consists of a number of descriptive rating scales focusing on many areas of behavior, including the child's interpersonal and affective domains, motivational variables, and the child's interest in specific modes of sensory experience. The sample of children used to standardize the IBR is only a portion of the standardization sample for the

Mental and Motor Scales. A total of 52 cases comprised the standardization sample for the IBR at 12 months. The distribution of ratings for the behavioral items for these children are presented in the BSID manual.

### Data Reduction and Descriptive Statistics

Two measures of language development, expressive language age (ELA) and receptive language age (RLA), were defined from the SICD administered at the clinic visit at 12 months. Frequency distributions for these scores are presented in Appendix 7.6. RLAs for 168 subjects ranged from 4 to 20 months with a median of 12 months. ELAs for the same subjects ranged from 4 to 20 months with a median of 16 months. Eighteen subjects had receptive language scores below the 12-month norm and two subjects had expressive language scores below the norm. (These numbers include both "delayed" and "borderline" cases.)

The finding that the subjects in our sample tended to show higher expressive scores than receptive scores is somewhat perplexing if one assumes that the development of receptive language precedes that of expressive language. If one considers, however, that the expressive scale items at this age are mainly "mother-report" while direct observations of infant behaviors are more prevalent in the receptive scale, we might guess that the difference here is between what the infants *can* do under usual circumstances and what the infants *will* do in the presence of a tester.

### Consistency of Language Scores Over Time

Results of the shortened form of the SICD used on the home visits at 4, 8, and 12 months provide an indication of the stability of the language scores over the first year (Table 7.3). The 12-month RLA was significantly correlated with the 4-month RLA (.18) and the 8-month RLA (.18). The 4-month ELA was significantly correlated with the 8-month ELA (.13) and the 12-month ELA (.12).

## TABLE 7.3

### CONSISTENCY OF EXPRESSIVE AND RECEPTIVE LANGUAGE AGE AT 4, 8, AND 12 MONTH USING HOME VERSION OF SICD

| | Time Points | |
|---|---|---|
| | 8 mo. | 12 mo. |
| Receptive Language Age | | |
| 4 mos. | .03 | .18* |
| 8 mos. | | .18* |
| Expressive Language Age | | |
| 4 mos. | .13* | .12* |
| 8 mos. | | .09 |

*Kendall Correlation Coefficients; $p < .01$; Range of N = 160-166.

## TABLE 7.4

### CONSISTENCY* OF EXPRESSIVE AND RECEPTIVE LANGUAGE AGE AT 4, 8, AND 12 MONTHS USING THE CLINIC VERSION OF SICD FOR SPECIAL COHORT

| | Time Points | |
|---|---|---|
| | 8 mo. | 12 mo. |
| Receptive Language Age | | |
| 4 mos. | -.01 | .18 |
| 8 mos. | | -.05 |
| Expressive Language Age | | |
| 4 mos. | .19 | .05 |
| 8 mos. | | .10 |

*Kendall Correlation Coefficients; none significant at $p < .05$; N = 23.

While all the correlations were positive, they were low. The same secular instability was found for the full test results on the special cohort (Table 7.4). This lack of consistency across time points probably reflects the irregular course of language development during the first year of life.

## Examiner Reliability on SICD

At 8 and 12 months Kendall Correlations between dual home visitors (N = 21 at both time points) were 1.0 for the RLA. For the ELA, Kendall Correlations were .88 for 8 months and 1.0 for 12 months. Interobserver reliability seemed to be no problem with the shortened home version.

## Home vs. Clinic Comparisons

Correlations between the overall scores for the full clinic and the home versions of the SICD were as follows:

| | RLA | ELA |
|---|---|---|
| Special Cohort (N = 33) | | |
| 4 months | .30 | .65 |
| 8 months | .31 | .30 |
| Total Sample (N = 162) | | |
| 12 months | .25 | .32 |

Even more important than the monotonicity of these measures is the validity of the simpler version as a categorical screening device. This is somewhat hard to evaluate from our data because there were very few cases of language delay. Some indication of the sensitivity and specificity of the shorter form, however, can be seen in the following comparison for receptive language:

Receptive Language Age at 12 Months

Full SICD

| | | Delayed (4 mos.) | Borderline (8 mos.) | Average (12 mos.) | Above Average (> 12 mos.) | Total |
|---|---|---|---|---|---|---|
| Short Home Version of SICD at 12 months | Delayed | 0 | 0 | 0 | 0 | 0 |
| | Borderline | 0 | 1 | 2 | 0 | 3 |
| | Average | 2 | 6 | 51 | 8 | 69 |
| | Above Average | 0 | 8 | 48 | 31 | 91 |
| | Total | 2 | 15 | 101 | 45 | 163 |

Of those children receiving both tests, there were two cases of delayed receptive language identified with the full form at 12 months of age; both of these were categorized as "average" by the home version. Of the 15 classed as borderline on the full form only one was correctly classified by the short version. Conversely, the home version identified three children as "borderline." Only one of these was borderline according to the full test; the other two were "normal." The trend in the above data is for the shortened version to obtain higher receptive language ages than the full SICD. This may be due to insensitivity of the simpler test, but it is very likely confounded by differences in child performance between the home setting and the strange university testing setting. This plus the high changeability of infant behavior over relatively short periods (there was at least two weeks between the home and CDMR testing) makes it difficult to evaluate the validity of the home SICD from these data.

Data Reduction and Descriptive Statistics: Mental, Motor, Behavior

Three scales of the Uzgiris-Hunt Scales of Infant Psychological Development provided measures of conceptual development of the infants at 12 months: 1) means for obtaining desired environmental events (abbreviated as means and ends), 2) vocal imitation, and 3) gestural imitation. Scores on these scales were defined as the highest scale point attained on each scale. It is assumed that an infant follows a sequence of steps in the development of a concept and his score is the level of conceptual development which he has attained.

Some difficulties arose in scoring the Vocal Imitation Scale. On the version of this scale that we used there were several items which used the mother as the model or were mother report items. In the revised scaling procedures described by Uzgiris and Hunt (1975), these items were not included in the scaling, so we did not assign scale scores for these items. The Vocal Imitation Scale also posed problems in the testing situation. About 31 percent of the subjects showed "no interest" in any of the vocal imitation items and thus did not meet criterion for even the lowest scale score. The examiner felt that the infants were tiring by this point in the testing; therefore we chose to call their data "missing" rather than make the assumption that their vocal imitation was extremely delayed.

The median scale score for Means and Ends was 10.4.[1] This indicates that half of the 12-month-olds in our sample had reached a stage of "anticipatory constructions of means adapted to an end" (Uzgiris-Hunt, 1975, p. 111). This stage is implied by their ability to use a string tied to an object to obtain the object while it is not in the direct line of sight. The median scale score for Vocal Imitation was 5.5. Half of the infants in our sample had attained a stage of "recognizing and imitating familiar sound patterns" (Uzgiris-Hunt, 1975, p. 114). The median scale score for Gestural Imitation was 7, indicating that 50 percent of our sample had attained the stage where they attempt, although without succeeding, to imitate "invisible" gestures such as blinking eyes (Uzgiris-Hunt, 1975, p. 115).

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[1] Frequency distributions for the three Uzgiris Hunt Scales are presented in Appendix 7.7.

The age norms for these scales must be considered rough estimates. They were based on the ages by which the steps in the sequence were attained by the majority of the infants in the Uzgiris-Hunt (1975) sample and represent an N of less than 10 at each month of age. Comparing the scale scores obtained by our infants with the rough norms provided by the Uzgiris-Hunt sample, 6.2 percent of our infants had deviantly low scores (more than 4 months below the rough norms) on Vocal Imitation, 7.3 percent were deviantly low on Gestural Imitation, and all were within the rough normal range for the Means and Ends scale.

Mental and motor development assessed by the Bayley Scales resulted in two scores:

1) the mental developmental index (MDI) and
2) the psycho-motor developmental index (PDI).

For the MDI our sample of 173 subjects showed a range of 70-140 with a mean of 117.0 and a standard deviation of 10.7.[1] The mean MDI for our sample was higher than the mean of the normalized standard scores of the 94 infants in Bayley's sample at 12 months of age. Only 1.2 percent of our sample showed delayed mental development (more than one standard deviation below the normalized mean).

For the PDI, our sample showed a range of 53-134 with a mean of 101.3 and a S.D. of 14.4. These values come closer to those of Bayley's standardization sample. Motor development appeared delayed in 12.1 percent of our sample.

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[1] Frequency distributions for MDI and PDI are presented in Appendix 7.8. The scores in these distributions are grouped into ranges based on normalized standard scores having a mean of 100 and a standard deviation of 16.

## Consistency of Mental and Motor Scores Over Time

Twenty-seven of the infants in the special cohort were given the Bayley scales at 4, 8, and 12 months. The correlations across time for the MDI and PDI on this portion of the sample ranged from -.09 to .25 (Table 7.5). We see the same lack of consistency for tested mental and psychomotor development during infancy as we saw for language.

## Data Reduction: Behavior

The infant's behavior at 12 months was assessed by the Bayley Infant Behavioral Record (IBR). The distributions of the behaviors assessed (Appendix 7.9) can be used to provide a general description of the behaviors typical of the 12-month-old infants in our sample. The infants appeared to have a strong interest in persons (52% rated 7 or higher), with a preference for interacting with their mothers. Most were accepting of the testing situation; only about 6 percent showed clearly uncooperative behaviors during the test. Their goal directedness, attention span, and endurance tended to be moderate. The infants were responsive in reaction to test stimuli (51% rated 7 or higher on reactivity). Interest in looking and manipulating or exploring with hands was higher than interest in listening. While 91 percent showed some mouthing of toys, very few infants sucked on their fingers or pacifiers.

In order to reduce the number of behaviors to a few variable sets which might describe categories of behaviors, we factor-analyzed the items in the IBR (Items 1-8 and 11-27). The seven resulting factors suggested groups of behaviors which fell together both statistically and intuitively. Normally,

## TABLE 7.5

## CONSISTENCY OF BAYLEY MENTAL (MDI) AND MOTOR (PDI) DEVELOPMENTAL INDEXES AT 4, 8, AND 12 MONTHS FOR SPECIAL COHORT

| | | Time Points | |
|---|---|---|---|
| | | 8 mo. | 12 mo. |
| MDI | | | |
| | 4 mos. | -.09 | .08 |
| | 8 mos. | | .25* |
| PDI | | | |
| | 4 mos. | .10 | .05 |
| | 8 mos. | | .14 |

*Kendall Correlation Coefficients; $p < .05$; N = 27.

factors which account for little of the variance would not be considered significant. In this case, however, we were interested in items which intercorrelated and which described a set of common behaviors. The variable sets formed in this way and their composition are summarized as follows:[1]

1) Activity
    6. Tension
    14. Activity
    21. Body motion
    25. Level of energy

2) Goal Orientation
    8. Responsiveness to objects
    11. Goal directedness
    12. Attention span
    13. Endurance
    20. Manipulating

3) Sensitivity
    1. Responsiveness to persons
    15. Reactivity
    16. Sights-looking
    17. Listening to sounds

4) Emotional Tone
    2. Responsiveness to examiner
    4. Cooperativeness
    5. Fearfulness (scale reversed)
    7. General emotional tone
    13. Endurance

5) Responsiveness
    1. Responsiveness to persons
    2. Responsiveness to examiner
    3. Responsiveness to mother

6) Coordination
    26. Coordination of gross muscles
    27. Coordination of fine muscles

7) Mouthing
    23. Mouthing or sucking--pacifier
    24. Mouthing or sucking--toys.

Scores for each of these variable sets derived from the IBR were constructed by summing the scores on the items within the set. Scale scores on Fearfulness (Item 5) were reversed due to a negative correlation with other items within this variable set.

Relationships to Maternal Education, Perinatal Risk and Sex

Only two developmental status variables were significantly related to mother's years of schooling and these were two sets from the IBR:

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[1] Correlations among the items within each of these seven variable sets are presented in Appendix 7.10.

Goal orientation score (tau = .10)
Sensitivity score (tau = .10).

Infants of mothers with higher education were slightly more goal-oriented and more sensitive to people and other stimuli. They did not, however, show differences on language, motor or mental development. This is consistent with other research which shows that effects of maternal education or family socioeconomic status on child development are not expressed in infancy (e.g., Knobloch and Pasamanick, 1960 and 1963; Willerman _et_ _al_., 1970; Ireton _et_ _al_., 1970).

There were only a few small associations between _perinatal_ _risk_ and 12-month developmental status. This general lack of relationship between perinatal complications and child behavior is similar to the findings of earlier chapters. Perhaps the perinatal experience has not yet had time to be expressed in developmental delay. In light of other findings (e.g., Broman _et_ _al_., 1975) it is more likely that mild or non-life threatening complications are overshadowed by the quality of the environment.

There were no significant relationships between _sex_ and any of the developmental status variables.

### _Relationships among Developmental Variables_

Correlations among the developmental status variables are presented in Table 7.6. Several interesting patterns appear. For example, infants with high receptive and expressive language scores tended to have high mental scores (MDI), high motor scores (PDI), and to be high in goal orientation, sensitivity, emotional tone, responsiveness, and coordination. This set of relationships is understandable since the ability to communicate underlies many of the tangible behaviors tested in instruments such as the Bayley Scales.

Intercorrelations among the three Uzgiris-Hunt Scales are low, suggesting

TABLE 7.6

CORRELATIONS AMONG DEVELOPMENTAL VARIABLES AT TWELVE MONTHS

| | Language (SICD) | Uzgiris-Hunt Scales | | | Bayley Scales | | Bayley Infant Behavioral Record | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Expressive | Means-Ends | Vocal | Gestural | MDI | PDI | Activity | Goal Orientation | Sensitivity | Emotional Tone | Responsiveness | Coordination | Mouthing |
| LANGUAGE (SICD) | | | | | | | | | | | | | |
| Receptive (RLA) | .31* | .11* | .09 | .04 | .19* | .09* | .09 | .17* | .20* | .16* | .25* | -.14* | -.03 |
| Expressive (ELA) | | .18* | .06 | -.02 | .25* | .21* | .05 | .22* | .15* | .16* | .21* | -.21* | -.21* |
| UZGIRIS-HUNT | | | | | | | | | | | | | |
| Means and Ends | | | -.04 | .09* | .16* | .18* | .01 | .16* | .09 | .19* | .06 | -.13* | -.20* |
| Vocal Imitation | | | | .04 | .16* | .03 | -.02 | .11* | .10 | .04 | .13* | -.07 | -.05 |
| Gestural Imitation | | | | | .04 | -.01 | .10* | -.01 | .07 | .12* | .03 | .08 | .03 |
| BAYLEY SCALES | | | | | | | | | | | | | |
| Mental (MDI) | | | | | | .21* | .08 | .38* | .28* | .23* | .27* | -.30* | -.19* |
| Motor (PDI) | | | | | | | .23* | .10* | .05 | .05 | .04 | -.51* | -.15* |
| BAYLEY BEHAVIORAL RECORD | | | | | | | | | | | | | |
| Activity | | | | | | | | -.11* | -.06 | -.03 | .07 | -.20* | .10* |
| Goal Orientation | | | | | | | | | .38* | .49* | .31* | -.23* | -.26* |
| Sensitivity | | | | | | | | | | .35* | .51* | -.17* | -.12* |
| Emotional Tone | | | | | | | | | | | .46* | -.15* | -.13* |
| Responsiveness | | | | | | | | | | | | -.10* | -.06 |
| Coordination (high=smooth) | | | | | | | | | | | | | .11* |

*Kendall Correlation Coefficients; $p < .05$; Range of N = 106-173.

A = 91, E = 4.5, 0 = 58

that they are tapping relatively independent conceptual schemas. Infants who scored high on the Means and Ends Scale had higher language scores and better mental and motor development; they also tended to have high goal orientation, high responsiveness to the testing situation, smooth coordination and little mouthing. These correlations suggest that the development of a conceptual means for obtaining environmental ends involves a broad scope of developmental skills.

### Relationships between Physical Health and Developmental Status at 12 Months

Relationships between the variables defined in the two major sections of this chapter, physical health and development, are summarized in Table 7.7.

Of the physical health variables, the number of severe illnesses reported by the mother during the first year of life showed the most relationships with the developmental measures. Infants with many severe illnesses tended to have lower mental and motor development scores on the Bayley and lower vocal imitation scores at 12 months. They also were lower in goal orientation, sensitivity to stimuli, emotional tone, responsiveness to people, and had poorer coordination and more mouthing (of toys and pacifiers).

The number of accidents also showed significant relationships with several of the developmental measures. Infants who had more accidents were more active and had more advanced motor development and smoother coordination. This finding suggests that it is not the infant with poorer coordination for his age that has more accidents but it is the infant who is more advanced motorically. Presumably, due to his earlier mobility, he gets himself into more accident-causing situations.

Of the developmental variables, the motor development score (PDI) and coordination showed the most relationships with the physical health variables.

## TABLE 7.7

## CORRELATIONS BETWEEN PHYSICAL HEALTH VARIABLES AND DEVELOPMENTAL VARIABLES AT TWELVE MONTHS

| | PHYSICAL HEALTH VARIABLES | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Health Care Record | | | | | | | Maternal Interviews | | | Physician Assessment |
| DEVELOPMENTAL VARIABLES | Height Percentile | Weight Percentile | Head Circumference | Hematocrit | Well-child Visits | Illness Visits | "Defect" Visits | Illnesses | Severe Illnesses | Accidents | Total Concerns |
| Language (SICD) | | | | | | | | | | | |
| Receptive | -.07 | -.02 | .03 | -.15* | .01 | -.05 | .10* | .08 | -.06 | .06 | -.05 |
| Expressive | .02 | -.02 | -.13* | -.18* | -.03 | .11* | .05 | .07 | -.03 | .09* | -.03 |
| Uzgiris-Hunt Scales | | | | | | | | | | | |
| Means-Ends | .04 | -.08 | -.14* | .01 | -.13* | .05 | .04 | .15* | .03 | .04 | .11* |
| Vocal Imitation | .21* | .07 | -.00 | .02 | -.03 | -.04 | -.06 | -.10 | -.16* | .00 | -.08 |
| Gestural Imitation | .00 | -.00 | .05 | .04 | -.03 | .01 | .08 | -.06 | -.07 | -.09 | -.04 |
| Bayley Scales | | | | | | | | | | | |
| MDI | .08 | -.06 | -.08 | -.08 | -.04 | .00 | .05 | .06 | -.14* | .08 | -.01 |
| PDI | .16* | .06 | -.01 | -.05 | .00 | .08 | -.04 | .02 | -.15* | .12* | -.15* |
| Bayley Behavioral Record | | | | | | | | | | | |
| Activity | -.06 | -.03 | -.04 | -.02 | -.03 | .08 | .05 | .12* | -.03 | .12* | -.12* |
| Goal Orientation | .11* | .04 | -.02 | -.03 | .07 | -.00 | .02 | .05 | -.09* | .03 | .04 |
| Sensitivity | .03 | -.02 | -.07 | .02 | .08 | -.11* | -.06 | -.05 | -.15* | .07 | .02 |
| Emotional Tone | .00 | -.06 | -.02 | .01 | .06 | -.03 | .11* | -.02 | -.08 | -.03 | .12* |
| Responsiveness | -.02 | -.08 | -.07 | -.02 | -.00 | -.06 | .04 | -.04 | -.11* | .12* | -.09* |
| Coordination | -.12* | -.06 | .10* | .01 | -.05 | -.05 | .00 | -.07 | .13* | -.16* | .08 |
| Mouthing | -.04 | -.02 | -.08 | .08 | .10* | .05 | .04 | -.02 | .15* | -.08 | .09 |

*Kendall Correlation Coefficients; p < .05; Range of N=97-160 (for correlations with hematocrit, range of N=67-71).

A = 154, E = 7.7, O = 35

Infants with more advanced motor development and those with smoother coordination tended to be taller, to have fewer severe illnesses, and to have more accidents. In addition, physicians tended to have more concerns about infants with lower motor scores.

Perhaps the most interesting finding in these relationships between physical health and developmental measures at 12 months is the apparent effect of illnesses on several important aspects of the infant's development. Infants who had many illnesses during the first year of life which were relatively long in duration and noticeably changed their behavior at the time of the illness not only showed delays in mental and motor development at 12 months but also showed less social responsiveness and sensitivity to stimuli.

## SUMMARY

The health and developmental status of our study children at 1 year on the variables for which there are norms was as follows:

| Health Indicators | % |
|---|---|
| Normal weight for height | 93.3 |
| Normal head circumference | 96.7 |
| Normal hematocrit | 98.6 |
| Recommended health supervision | 86.0 |
| Normal mental development | 98.8 |
| Normal motor development | 87.9 |
| Normal expressive language | 100.0 |
| Normal receptive language | 98.8 |

Their primary health caretakers rated the infants' physical health as "normal" or "better than normal" for 94.7 percent. According to the mothers' reports though, 23 percent of the infants experienced eight or more illnesses during their first year and 10 percent had two or more severe illnesses. Although none of the reported accidents were severe in terms of effect on the child's behavior and the duration of the effect, 23 accidents were serious enough to require medical care. Since accidents cause a large proportion of childhood morbidity and mortality, future analysis will address the patterns of family characteristics which relate to accident-proneness. The children were taller on the average than normative distributions, however 11 did have low weight for height. Of those whose health records were available all had some medical supervision during their first year; the great majority had the recommended number of care contacts.

Normally we would expect greater associations between health care utilization and socioeconomic indicators than we found. It it important to remember in this regard the influences of availability of care through the Group Health Cooperative, a prepaid plan, for this sample. The availability plus utilization also undoubtedly are reflected in the overall picture of health status for this particular group of children. And, since much of our information on status came from within the health care agency, our data are less than complete for those who did not maintain membership there.

These factors should also be considered for their potential effects on other findings such as the lack of association between perinatal complications and 12-month status; perhaps the intervening care, at least for those who maintained it so we could document it, overcame the potential effects.

Fourteen percent of the infants scored low on motor development. This is significant since infant testing is said to be most sensitive to psychomotor problems. While motor behavior can not be equated with intellectual potential it is a critical part of assessing neuromotor integrity (Knobloch and Pasamanick, 1963).

As is typical of infancy, in the absence of neurological or other physical pathology, the other developmental measures showed little variability with most of the children at or above the norms. For those who at 1 year scored below the norms, due to the general unpredictability of infant tests, it is likely that at least some of them will have improved scores when evaluated at later ages. Since social and environmental influences are not reflected in developmental test results in infants, it is also likely that some of the normal scorers will drop at older testings (Gesell and Amatruda, 1974). Thus as we follow this sample we expect greater diversity in their developmental progress, and as the effects of different home environments are expressed we will have the opportunity to test the infant predictors from this study.

The multiple measures of status used at 12 months of age showed logical patterns of relationships. They are not independent; rather they are different ways of looking at health and development which we would expect to be interrelated. As future outcome data are available we will attempt to consider multiple measures of health and development simultaneously. Since the multiple measures are correlated it indicates that some children may have multiple problems.

The developmental measures which we used at different times during infancy, i.e., the modified language inventory and the Bayley Scales, were quite unstable across time. Our results indicate that this inconsistency is not due to interobserver unreliability but is more likely due to the changeability of babies. Findings such as these must make us question the value of developmental testing for children under 1 year as a routine part of any screening protocol.

APPENDIX 7.1

SUMMARY AND DESCRIPTIVE STATISTICS FOR STATUS VARIABLES

| Source | Variable | Composition of Variable Set | Median | Range | N | Direction of Values |
|---|---|---|---|---|---|---|
| Health Care Record Abstract (12 mo.) | Height percentile | Individual Score: height converted to percentile for age/sex (Stuart norms) | 50-75th | 0-100th | 164 | high=tall |
| | Weight percentile | Individual Score: Weight converted to percentile for age/sex (Stuart norms) | 25-49th | 0-100th | 164 | high=heavy |
| | Weight for height | Dichotomous variable:<br>1 = normal weight for height<br>2 = low weight for height | | | <br>153<br>11 | |
| | Head circumference | Individual Score: OFC converted to S.D. range for age/sex (Nellhaus norms) | within 2 S.D. | -2S.D. to +2S.D. | 152 | high=large OFC |
| | Hematocrit | Individual Score: HCT in percent | 35.99% | 32-42% | 73 | high=high HCT |
| | No. of well-child visits | Number of: regular well-child visits | 4.92 | 1-5 | 164 | high=recommended number |
| | No. of illness visits | Number of: visits for illnesses | 2.86 | 0-14 | 164 | high=many illness visits |
| | No. of "defect" visits | Number of: visits for congenital defects | 0.09 | 0-21 | 164 | high=many "defect" visits |
| Interviews (4,8,12 months) | No. of illnesses first year | Number of: illnesses reported by mother at 4,8,and 12 months | 5.17 | 1-14 | 161 | high=many illnesses |
| | No. of severe illnesses first year | Number of: illnesses above which had "some" or "much" effect on child and lasted 2 or more weeks | 0.33 | 0-9 | 161 | high=many severe illnesses |
| | No. of accidents first year | Number of: accidents reported by mother at 4,8,and 12 months | 2.40 | 0-7 | 161 | high=many accidents |
| Physician's Assessment | Total physician's concerns | Number of: suspect-abnormal conditions in I-VI | 0.19 | 0-8 | 151 | high=many concerns |
| | Perinatal concerns | Dichotomous variable:<br>1 = none<br>2 = one | | | <br>132<br>19 | |
| | Physical health concerns | Dichotomous variable:<br>1 = none<br>2 = one | | | <br>143<br>8 | |
| | Developmental concerns | Dichotomous variable:<br>1 = none<br>2 = one or more | | | <br>147<br>4 | |
| | Environmental concerns | Dichotomous variable:<br>1 = none<br>2 = one or more | | | <br>138<br>13 | |
| | Health practices concerns | Dichotomous variable:<br>1 = none<br>2 = one or more | | | <br>137<br>14 | |
| | Congenital abnormality concerns | Dichotomous variable:<br>1 = none<br>2 = one | | | <br>142<br>9 | |

APPENDIX 7.1 (continued)

| Source | Variable | Composition of Variable Set | Median | Range | N | Direction of Values |
|---|---|---|---|---|---|---|
| Sequenced Inventory of Communication Development | Receptive Language Age | Individual Score:<br>RLA | 12 mos. | 4-20 mos. | 168 | high=advanced receptive language |
| | Expressive Language Age | Individual Score:<br>ELA | 16 mos. | 8-20 mos. | 168 | high=advanced expressive language |
| Uzgiris-Hunt Scales of Psychological Development | Means and Ends Scale Score | Individual Score:<br>highest scale score attained | 10.38 | 6-13 | 164 | high=advanced development |
| | Vocal Imitation Scale | Individual Score:<br>highest scale score attained | 5.54 | 4-8 | 113 | high=advanced development |
| | Gesture Imitation Scale Scale Score | Individual Score:<br>highest scale score attained | 6.94 | 2-9 | 164 | high=advanced development |
| Bayley Behavioral Record | Activity score | Sum of Scores:<br>6. Tension<br>14. Activity<br>21. Body motion<br>25. Level of energy | 17.86 | 11-26 | 169 | high=high activity |
| | Goal Orientation score | Sum of Scores:<br>8. Responsiveness to objects<br>11. Goal directedness<br>12. Attention span<br>13. Endurance<br>20. Manipulating | 29.86 | 17-41 | 168 | high=high goal orientation |
| | Sensitivity score | Sum of Scores:<br>1. Responsiveness to persons<br>15. Reactivity<br>16. Sights-looking<br>17. Listening-sounds | 24.74 | 15-34 | 169 | high=high sensitivity |
| | Emotional Tone score | Sum of Scores:<br>2. Responsiveness to examiner<br>4. Cooperativeness<br>5. Fearfulness (scale reversed)<br>7. General emotional tone<br>13. Endurance | 29.65 | 17-39 | 170 | high=high responsiveness to testing |
| | Responsiveness score | Sum of Scores:<br>1. Responsiveness to persons<br>2. Responsiveness to examiner<br>3. Responsiveness to mother | 14.66 | 9-19 | 172 | high=high responsiveness to people |
| | Coordination score | Sum of Scores:<br>26. Coordination of gross muscles<br>27. Coordination of fine muscles | 5.70 | 2-8 | 171 | high=poor coordination |
| | Mouthing score | Sum of Scores:<br>23. Mouthing or sucking-pacifier<br>24. Mouthing or sucking-toys | 4.37 | 2-17 | 172 | high=much mouthing |
| Bayley Scales of Infant Development (Mental and Psychomotor Scales) | Mental Developmental Index | Individual Score:<br>MDI | 117.04[1]<br>(10.72) | 70-140 | 173 | high=advanced mental development |
| | Psychomotor Developmental Index | Individual Score:<br>PDI | 101.34[1]<br>(14.41) | 53-134 | 173 | high=advanced motor development |

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[1] Mean (SD)

## APPENDIX 7.2

### FREQUENCY DISTRIBUTION FOR HEIGHT PERCENTILE AT TWELVE MONTHS

| alue | Height Percentile Categories[1] | N | % |
|---|---|---|---|
| 1 | Below 3rd | 4 | 2.4 |
| 2 | 3rd to 9th | 3 | 1.8 |
| 3 | 10th to 24th | 18 | 11.0 |
| 4 | 25th to 49th | 29 | 17.7 |
| 5 | 50th to 75th | 47 | 28.7* |
| 6 | 76th to 90th | 19 | 11.6 |
| 7 | 91st to 97th | 26 | 15.9 |
| 8 | Above 97th | 18 | 11.0 |
| otal | | 164 | |

[1] Categories are percentile ranges based on normative data of Stuart and eredith (1946).

*Median = 5.1

### FREQUENCY DISTRIBUTION FOR WEIGHT PERCENTILE AT TWELVE MONTHS

| Value | Weight Percentile Categories[1] | N | % |
|---|---|---|---|
| 1 | Below 3rd | 11 | 6.7 |
| 2 | 3rd to 9th | 19 | 11.6 |
| 3 | 10th to 24th | 29 | 17.7 |
| 4 | 25th to 49th | 43 | 26.2* |
| 5 | 50th to 75th | 36 | 22.0 |
| 6 | 76th to 90th | 18 | 11.0 |
| 7 | 91st to 97th | 5 | 3.0 |
| 8 | Above 97th | 3 | 1.8 |
| Total | | 164 | |

[1] Categories are percentile ranges based on normative data of Stuart and Meredith (1946).

*Median = 4.0

### FREQUENCY DISTRIBUTION FOR WEIGHT FOR HEIGHT AT TWELVE MONTHS

| Percentile Line Difference Between Weight and Height[1] | N | % | |
|---|---|---|---|
| -2 | 6 | 3.7 | Normal Weight For Height |
| -1 | 17 | 10.4 | |
| 0 | 28 | 17.1 | |
| 1 | 43 | 26.2 * | |
| 2 | 37 | 22.6 | |
| 3 | 22 | 13.4 | |
| 4 | 9 | 5.5 | Low Weight For Height |
| 5 | 2 | 1.2 | |
| | 164 | | |

[1] Positive values represent weight in lower percentile range than height,

*Median = 1.2

### FREQUENCY DISTRIBUTION FOR HEAD CIRCUMFERENCE AT TWELVE MONTHS

| Value | Head Circumference Category[1] | N | % |
|---|---|---|---|
| 1 | Greater than - 2 S.D. | 3 | 2.0 |
| 2 | - 2 S.D. | 69 | 45.4 |
| 3 | + 2 S.D. | 78 | 51.3 |
| 4 | Greater than + 2 S.D. | 2 | 1.3 |
| Total | | 152 | |

[1] Categories are standard deviation (S.D.) ranges based on normative data of Nellhaus (1968).

*Median = 2.5

## APPENDIX 7.3

### FREQUENCY DISTRIBUTION OF NUMBER OF WELL-CHILD VISITS AT HEALTH CARE FACILITY DURING FIRST YEAR

| Number of Well-Child Visits | N | % |
|---|---|---|
| 1 | 2 | 1.2 |
| 2 | 1 | 0.6 |
| 3 | 4 | 2.4 |
| 4 | 16 | 9.8 |
| 5 | 141 | 86.0* |
| Total | 164 | |

*Median = 4.9

### FREQUENCY DISTRIBUTION OF NUMBER OF VISITS TO HEALTH CARE FACILITY FOR MANAGEMENT OF CONGENITAL CONDITIONS DURING FIRST YEAR

| Number of "Defect" Visits | N | % |
|---|---|---|
| 0 | 138 | 84.1* |
| 1 | 8 | 4.9 |
| 2 | 3 | 1.8 |
| 3 | 7 | 4.3 |
| 4 | 1 | 0.6 |
| 5 | 1 | 0.6 |
| 6 | 2 | 1.2 |
| 8 | 1 | 0.6 |
| 9 | 1 | 0.6 |
| 10 | 1 | 0.6 |
| 23 | 1 | 0.6 |
| Total | 164 | |

*Median = 0.1

### FREQUENCY DISTRIBUTION OF NUMBER OF VISITS TO HEALTH CARE FACILITY FOR ILLNESSES DURING FIRST YEAR

| Number of Illness Visits | N | % |
|---|---|---|
| 0 | 18 | 11.0 |
| 1 | 32 | 19.5 |
| 2 | 23 | 14.0 |
| 3 | 25 | 15.2* |
| 4 | 21 | 12.8 |
| 5 | 9 | 5.5 |
| 6 | 12 | 7.3 |
| 7 | 6 | 3.7 |
| 8 | 3 | 1.8 |
| 9 | 5 | 3.0 |
| 10 | 3 | 1.8 |
| 11 | 2 | 1.2 |
| 12 | 2 | 1.2 |
| 13 | 1 | 0.6 |
| 14 | 2 | 1.2 |
| Total | 164 | |

*Median = 2.9

## APPENDIX 7.4

### FREQUENCY DISTRIBUTIONS FOR TYPE AND SEVERITY OF ILLNESSES REPORTED BY MOTHERS AT EACH TIME POINT

| Type of Illness | | 4 mo. | 8 mo. | 12 mo. |
|---|---|---|---|---|
| Allergies | No. reported | 14 | 15 | 19 |
| | No. severe | 2 | 1 | 4 |
| | % severe | 14.3 | 6.7 | 21.0 |
| Colds | No. reported | 111 | 131 | 148 |
| | No. severe | 11 | 7 | 17 |
| | % severe | 9.9 | 5.3 | 11.5 |
| Colic | No. reported | 55 | 6 | 2 |
| | No. severe | 28 | 1 | 0 |
| | % severe | 50.9 | 16.7 | 0 |
| Flu | No. reported | 9 | 25 | 45 |
| | No. severe | 1 | 4 | 5 |
| | % severe | 11.1 | 16.0 | 11.1 |
| Infections | No. reported | 26 | 23 | 52 |
| | No. severe | 2 | 7 | 9 |
| | % severe | 7.7 | 30.4 | 17.3 |
| Rashes | No. reported | 63 | 49 | 48 |
| | No. severe | 2 | 3 | 4 |
| | % severe | 3.2 | 6.1 | 8.3 |
| Other | No. reported | 30 | 49 | 56 |
| | No. severe | 2 | 5 | 5 |
| | % severe | 6.7 | 10.2 | 8.9 |
| Total | No. reported | 308 | 298 | 370 |
| | No. severe | 48 | 28 | 44 |
| | % severe | 15.6 | 9.4 | 11.9 |
| No. of subjects | | 177 | 165 | 172 |
| Median number of Illnesses per subject | | 1.5 | 1.5 | 1.8 |
| Median number of Severe Illnesses per subject | | 0.2 | 0.1 | 0.1 |

### FREQUENCY DISTRIBUTIONS FOR NUMBER OF ACCIDENTS REPORTED BY MOTHERS AT EACH TIME POINT

| Type of accident | 4 mo. | 8 mo. | 12 mo. |
|---|---|---|---|
| Blows - Child Active | | | |
| Open field | 5 | 51 | 124 |
| Falls | 34 | 69 | 43 |
| Blows - Child Passive | | | |
| Dropped | 2 | 2 | 6 |
| Unusual | 8 | 3 | 4 |
| Other - | | | |
| Bites | 1 | 1 | 2 |
| Burns | 6 | 10 | 12 |
| Ingestion | 1 | 11 | 18 |
| Other | 2 | 8 | 16 |
| Total Accidents | 59 | 155 | 225 |
| No. of subjects | 177 | 165 | 172 |
| Median number of Accidents per subject | 0.1 | 0.8 | 1.2 |

## APPENDIX 7.5

### FREQUENCY DISTRIBUTION OF NUMBER OF ILLNESSES REPORTED BY MOTHER DURING FIRST YEAR

| Number of Illnesses | N | % |
|---|---|---|
| 1 | 1 | 0.6 |
| 2 | 11 | 6.8 |
| 3 | 27 | 16.8 |
| 4 | 26 | 16.1 |
| 5 | 23 | 14.3* |
| 6 | 25 | 15.5 |
| 7 | 11 | 6.8 |
| 8 | 9 | 5.6 |
| 9 | 11 | 6.8 |
| 10 | 5 | 3.1 |
| 11 | 8 | 5.0 |
| 12 | 2 | 1.2 |
| 13 | 1 | 0.6 |
| 14 | 1 | 0.6 |
| Total | 161 | |

*Median = 5.2

### FREQUENCY DISTRIBUTION OF NUMBER OF ACCIDENTS REPORTED BY MOTHER DURING FIRST YEAR

| Number of Accidents | N | % |
|---|---|---|
| 0 | 11 | 6.8 |
| 1 | 39 | 24.2 |
| 2 | 34 | 21.1* |
| 3 | 28 | 17.4 |
| 4 | 28 | 17.4 |
| 5 | 12 | 7.5 |
| 6 | 5 | 3.1 |
| 7 | 4 | 2.5 |
| Total | 161 | |

*Median = 2.4

### FREQUENCY DISTRIBUTION OF NUMBER OF SEVERE ILLNESSES REPORTED BY MOTHER DURING FIRST YEAR

| Number of Severe Illnesses[1] | N | % |
|---|---|---|
| 0 | 97 | 60.2* |
| 1 | 47 | 29.2 |
| 2 | 7 | 4.3 |
| 3 | 7 | 4.3 |
| 5 | 2 | 1.2 |
| 9 | 1 | 0.6 |
| Total | 161 | |

[1] Severe illnesses are those which mother reported as having "some" or "much" effect on the infant and lasting two or more weeks.

*Median = 0.3

## APPENDIX 7.6

### FREQUENCY DISTRIBUTION FOR RECEPTIVE LANGUAGE AGE (RLA) AT 12 MONTHS

| Value | RLA (Months) | N | % |
|---|---|---|---|
| 1 | 4 | 2 | 1.2 |
| 2 | 8 | 16 | 9.5 |
| 3 | 12 | 102 | 60.7 * |
| 4 | 16 | 42 | 25.0 |
| 5 | 20 | 6 | 3.6 |
|  | Total | 168 |  |

*Median = 3.1 (approx. 12 months)

### FREQUENCY DISTRIBUTION FOR EXPRESSIVE LANGUAGE AGE (ELA) AT 12 MONTHS

| Value | ELA (months) | N | % |
|---|---|---|---|
| 1 | 4 | 0 | 0 |
| 2 | 8 | 2 | 1.2 |
| 3 | 12 | 18 | 10.7 |
| 4 | 16 | 97 | 57.7 * |
| 5 | 20 | 51 | 30.4 |
|  | Total | 168 |  |

*Median = 4.2 (approx. 16 months)

## APPENDIX 7.7

### FREQUENCY DISTRIBUTION OF UZGIRIS-HUNT MEANS AND ENDS SCALE SCORES AT 12 MONTHS

| Highest Scale Score | Rough Age Norm (months) | N | % |
|---|---|---|---|
| 6 | 8 | 3 | 1.8 |
| 7 | 9 | 4 | 2.4 |
| 8 | 10 | 4 | 2.4 |
| 9 | 12 | 11 | 6.7 |
| 10 | 13 | 68 | 41.5* |
| 11 | 15-18 | 37 | 22.6 |
| 12 | 19-20 | 26 | 15.9 |
| 13 | 22 | 11 | 6.7 |
| Total | | 164 | |

*Median = 10.4 (approx. 13 months).

### FREQUENCY DISTRIBUTION OF UZGIRIS-HUNT VOCAL IMITATION SCALE SCORES AT 12 MONTHS

| Highest Scale Score | Rough Age Norm (months) | N | % |
|---|---|---|---|
| 4 | 4 | 7 | 6.2 |
| 5 | 9 | 48 | 42.5 * |
| 6 | 12 | 35 | 31.0 |
| 7 | 12-14 | 17 | 15.0 |
| 8 | 14 | 6 | 5.3 |
| Total | | 113 | |

*Median = 5.5 (approx. 9-12 months)

### FREQUENCY DISTRIBUTION OF UZGIRIS-HUNT GESTURAL IMITATION SCALE SCORES AT 12 MONTHS

| Highest Scale Score | Rough Age Norm (months) | N | % |
|---|---|---|---|
| 2 | 7 | 12 | 7.3 |
| 3 | 8 | 7 | 4.3 |
| 5 | 10 | 42 | 25.1 |
| 7 | 14 | 48 | 28.7* |
| 8 | 14-17 | 41 | 25.0 |
| 9 | 14-20 | 14 | 8.5 |
| Total | | 164 | |

*Median = 7.0 (approx. 14 months)

## APPENDIX 7.8

### FREQUENCY DISTRIBUTION FOR BAYLEY MENTAL DEVELOPMENTAL INDEX (MDI) AT TWELVE MONTHS

| MDI | N | % |
|---|---|---|
| Below 84 | 2 | 1.2 |
| 84 - 116 | 69 | 39.9 |
| Above 116 | 102 | 58.9 |
| Total | 173 | |

Mean = 117.0; S.D. = 10.7; Median = 118.3; Range = 70-140.

### FREQUENCY DISTRIBUTION FOR BAYLEY PSYCHOMOTOR DEVELOPMENTAL INDEX (PDI) AT TWELVE MONTHS

| PDI | N | % |
|---|---|---|
| Below 84 | 21 | 12.1 |
| 84 - 116 | 120 | 69.4 |
| Above 116 | 32 | 18.5 |
| Total | 173 | |

Mean = 101.3; S.D. = 14.4; Median = 103.7; Range = 53-134.

# APPENDIX 7.9

## FREQUENCY DISTRIBUTION OF RATINGS FOR THE BAYLEY INFANT BEHAVIORAL RECORD AT TWELVE MONTHS (N = 173)

| | | | Scale Points | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Item | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Omit | |
| 1 | Responsiveness to Persons | None | 0 | 0 | 2 | 1 | 21 | 60 | 56 | 27 | 7 | 0 | Much |
| 2 | Responsiveness to Examiner | Avoid | 2 | 9 | 48 | 80 | 34 | -- | -- | -- | -- | 0 | Invite |
| 3 | Responsiveness to Mother | Avoid | 0 | 0 | 17 | 91 | 64 | -- | -- | -- | -- | 1 | Invite |
| 4 | Cooperativeness | None | 0 | 2 | 9 | 13 | 61 | 27 | 49 | 9 | 2 | 1 | Much |
| 5 | Fearfulness | None | 66 | 54 | 32 | 7 | 4 | 4 | 5 | 0 | 0 | 1 | Much |
| 6 | Tension | Low | 0 | 1 | 62 | 61 | 40 | 7 | 0 | 0 | 0 | 2 | High |
| 7 | General Emotional Tone | Unhappy | 0 | 2 | 4 | 12 | 52 | 28 | 50 | 17 | 5 | 3 | Happy |
| 8 | Responsiveness to Objects | None | 0 | 0 | 3 | 6 | 62 | 46 | 44 | 4 | 3 | 5 | Much |
| 9 | Imaginative Play with materials | Yes | 21 | 149 | -- | -- | -- | -- | -- | -- | -- | 3 | No |
| 10 | Attachment to Object | Yes | 18 | 152 | -- | -- | -- | -- | -- | -- | -- | 3 | No |
| 11 | Goal Directedness | None | 0 | 0 | 14 | 7 | 52 | 33 | 46 | 15 | 3 | 3 | Much |
| 12 | Attention Span | Short | 0 | 3 | 10 | 2 | 61 | 43 | 38 | 9 | 4 | 3 | Long |
| 13 | Endurance | Little | 0 | 0 | 5 | 10 | 54 | 23 | 54 | 16 | 8 | 3 | Much |
| 14 | Activity | None | 0 | 0 | 3 | 2 | 89 | 44 | 28 | 7 | 0 | 0 | Much |
| 15 | Reactivity | None | 0 | 0 | 2 | 5 | 34 | 43 | 81 | 4 | 4 | 0 | Much |
| 16 | Sights-Looking | None | 0 | 0 | 0 | 6 | 50 | 69 | 40 | 6 | 0 | 2 | Excessive |
| 17 | Listening to Sounds | None | 0 | 0 | 0 | 18 | 59 | 53 | 32 | 7 | 0 | 4 | Excessive |
| 18 | Producing Sounds - Vocal | None | 0 | 2 | 7 | 34 | 70 | 34 | 20 | 2 | 0 | 4 | Excessive |
| 19 | Producing Sounds-Banging | None | 5 | 17 | 15 | 25 | 50 | 36 | 20 | 3 | 0 | 2 | Excessive |
| 20 | Manipulating | None | 0 | 0 | 0 | 8 | 59 | 58 | 41 | 5 | 0 | 2 | Excessive |
| 21 | Body Motion | None | 0 | 0 | 1 | 8 | 94 | 39 | 22 | 7 | 0 | 2 | Excessive |
| 22 | Mouthing - Fingers | None | 126 | 22 | 13 | 6 | 3 | 1 | 0 | 1 | 0 | 1 | Excessive |
| 23 | Mouthing - Pacifier | None | 137 | 11 | 14 | 3 | 5 | 0 | 0 | 2 | 0 | 1 | Excessive |
| 24 | Mouthing - Toys | None | 15 | 44 | 48 | 33 | 18 | 10 | 1 | 2 | 1 | 1 | Excessive |
| 25 | Level of Energy | Low | 0 | 9 | 108 | 46 | 8 | -- | -- | -- | -- | 2 | High |
| 26 | Coordination-Gross Muscle | Smooth | 6 | 40 | 112 | 13 | 0 | -- | -- | -- | -- | 2 | Poor |
| 27 | Coordination-Fine Muscle | Smooth | 2 | 48 | 110 | 10 | 1 | -- | -- | -- | -- | 2 | Poor |

-- = Scale point not applicable to behavior.

## PEARSON CORRELATIONS AMONG ITEMS IN ACTIVITY SCORE FROM BAYLEY INFANT BEHAVIORAL RECORD AT TWELVE MONTHS

| | Activity | Body Motion | Level of Energy |
|---|---|---|---|
| Tension | .48 | .48 | .40 |
| Activity | | .85 | .77 |
| Body Motion | | | .79 |

## PEARSON CORRELATIONS AMONG ITEMS IN GOAL ORIENTATION SCORE FROM BAYLEY INFANT BEHAVIORAL RECORD AT TWELVE MONTHS

| | Goal Directedness | Attention Span | Endurance | Manipulating |
|---|---|---|---|---|
| Responsiveness to Objects | .58 | .57 | .41 | .42 |
| Goal Directedness | | .71 | .46 | .48 |
| Attention Span | | | .60 | .41 |
| Endurance | | | | .30 |

## PEARSON CORRELATIONS AMONG ITEMS IN RESPONSIVENESS SCORE FROM BAYLEY INFANT BEHAVIORAL RECORD AT TWELVE MONTHS

| | Responsiveness to Examiner | Responsiveness to Mother |
|---|---|---|
| Responsiveness to Persons | .38 | .47 |
| Responsiveness to Examiner | | .44 |

## PEARSON CORRELATIONS AMONG ITEMS IN COORDINATION SCORE FROM BAYLEY INFANT BEHAVIORAL RECORD AT TWELVE MONTHS

| | Coordination Fine Muscle |
|---|---|
| Coordination Gross Muscle | .44 |

## PEARSON CORRELATIONS AMONG ITEMS IN EMOTIONAL TONE SCORE FROM BAYLEY INFANT BEHAVIORAL RECORD AT TWELVE MONTHS

| | Fearfulness | General Emotional Tone | Endurance | Cooperativeness |
|---|---|---|---|---|
| Responsiveness to Examiner | -.56 | .40 | .33 | .34 |
| Fearfulness | | -.39 | -.23 | -.18 |
| General Emotional Tone | | | .68 | .52 |
| Endurance | | | | .50 |

## PEARSON CORRELATIONS AMONG ITEMS IN SENSITIVITY SCORE FROM BAYLEY INFANT BEHAVIORAL RECORD AT TWELVE MONTHS

| | Sights-looking | Listening to Sounds | Responsiveness to Persons |
|---|---|---|---|
| Reactivity | .49 | .40 | .45 |
| Sights-looking | | .43 | .35 |
| Listening to Sounds | | | .27 |

## PEARSON CORRELATIONS AMONG ITEMS IN MOUTHING SCORE FROM BAYLEY INFANT BEHAVIORAL RECORD AT TWELVE MONTHS

| | Mouthing - Toys |
|---|---|
| Mouthing - Pacifier | .33 |

# CHAPTER 8

# OVERVIEW OF FINDINGS

Now that we have considered the instrumentation and basic descriptive findings for each of the conceptual areas, let us stand back and consider the results of our study from a broader perspective. The objectives of this research covered two broad areas: one focused on methodological issues in screening and assessment, the other on theoretical issues in early processes of child development.

## METHODOLOGICAL ISSUES

### Obtaining the Information

We found, for most of the instruments we tried, that our study team could be trained to obtain the information reliably. This was true even for the most complex ones such as the Brazelton Neonatal Assessment. For those not requiring physical manipulation, such as the maternal interviews and the interaction observations, the non-nurses on our staff also achieved high inter-rater agreement.

Interobserver reliability is, of course, a prime requisite for systematic screening and assessment. We found that adequate training and periodic recalibration of personnel to maintain observational skills were absolute necessities in achieving long-term reliability among our staff; uniformity of information-gathering skills does not come automatically nor is it magically retained once achieved.

Those families who decided against study participation might have reacted differently to our procedures, however, on the whole, the project families were very cooperative and responsive to all our information-gathering techniques. With further service trials the willingness of families to provide screening and assessment information can be further evaluated. The reactions of patient populations can be used to further modify the content and methods for eliciting decision-making data to optimize systematic participation.

## Identifying Individual Differences

Our work has shown it is possible to identify differences among babies, their parents, their developmental environments, and the personal interaction occurring during child rearing. For example, the tendency is to believe that at birth all babies are cuddly creatures who are consolable when distressed, and essentially unaware of what goes on around them. From our examinations at 2 days of age it is evident that these generalizations are not applicable to newborns as a group; as early as birth they show differences on their ability to be consoled, on their body molding needed for cuddling, and in their alertness to sights and sounds (Figure 8.1). Recognition of these differences opens opportunities to assist in parent adaptation to child characteristics. Demonstration of the newborn's responsiveness to environmental stimuli is one way to encourage and reinforce parental interaction with the child right from birth.

Similarly, our interviews with mothers made evident some differences not possible to know without asking the mother. Not all mothers were overjoyed or even pleased at the prospect or realization of motherhood. And they differed greatly in their expectations of child development. Certainly there are implications for systematic assessment of these expectations prenatally and for appropriate educational activity when some mothers do not anticipate the importance of talking to their children until they are 2 years old.

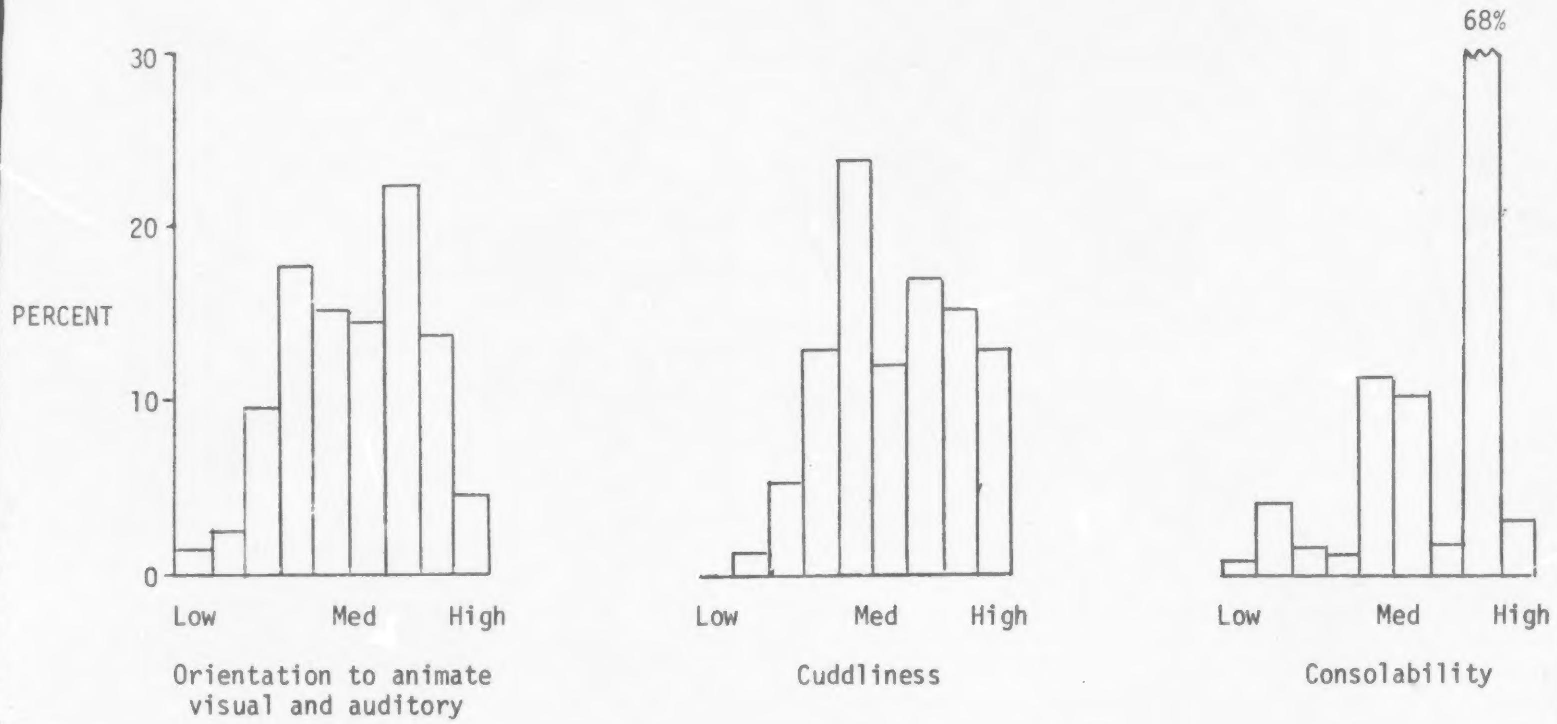

Figure 8.1 Percent Distribution on Selected Brazelton Newborn Assessment Items

For many years people responsible for maternal and child care have been guided in their programs by high risk characteristics such as maternal age, marital status, and complications of pregnancy. It is general knowledge that some families have fewer resources than others in the neonatal and post-natal periods (Goldstein, 1973). The full impact of this fact, however, can only be fully appreciated with the documentation from assessment methods such as we used. Table 8.1, for example, shows the profiles for the five mothers who scored lowest on the Home Stimulation Inventory when their children were a year old. All of these mothers were under 19 years of age, had 12 years of schooling or less and were single or separated. Relative to the other mothers most had late developmental expectations as to when their babies would see, hear and be aware of their surroundings. They reported high life change, not just at 12 months, but throughout pregnancy and their babies' first year. The stimulation in the home environment for these children was chronically low. The scores on maternal feeding behavior tended to be below the median, and the outstanding trend in these mothers' teaching style was the increasing use of intrusive techniques such as forcing and physical guidance as the children reached a more independent stage of development at 1 year. Table 8.1 illustrates another point which has methodological implications: often we were not able to locate these families for sequential contacts or the situation was so disrupted when we did find them that it precluded observations of mother-child interaction which would have been quite routine in most homes.

Systematically identifying individual differences also allows us to document problems and progress in groups of children. For instance, some of the most common concerns of our study parents were disrupted schedules and trying to establish workable family routines around their infants' patterns. Figure 8.2 shows the low, medium, and high regularity of sleep groups for

## TABLE 8.1

## PROFILES OF THE FIVE SUBJECTS WITH THE LOWEST HOME STIMULATION INVENTORY SCORES AT 12 MONTHS

| Subject | Prenatal Developmental Expectations* | Life Change* | | H S I Total Score* | | | Mother's Feeding Score* | | | | Teaching Techniques* (easy task) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Cumulative through 8 months | 12 mo. | 4 mo. | 8 mo. | 12 mo. | 1 mo. | 4 mo. | 8 mo. | 12 mo. | 1 mo. | 4 mo. | 8 mo. | 12 mo. |
| A | 99.4 | 98.1 | 96.5 | 3.4 | 1.2 | 1.2 | 9.9 | 24.1 | 21.0 | NA | 2.3 | 41.0 | 33.3 | 100.0 |
| B | 97.1 | 90.5 | 82.7 | .6 | NA | 3.0 | 48.9 | .6 | NA | 41.8 | 6.9 | 98.3 | NA | 98.0 |
| C | 66.7 | NA | 100.0 | NA | NA | 3.0 | .5 | NA | NA | NA | 6.9 | NA | NA | NA |
| D | 28.0 | 81.6 | 24.3 | 11.8 | 29.6 | 3.0 | 1.1 | 5.7 | 21.0 | 26.7 | 60.9 | 93.3 | 11.7 | 37.5 |
| E | 82.2 | 100.0 | 89.0 | 3.4 | 12.3 | .6 | 18.7 | 82.3 | NA | 5.5 | 14.4 | 41.0 | 11.7 | 90.1 |

*Figures show percentile placement within the total distribution.

NA = Not available.

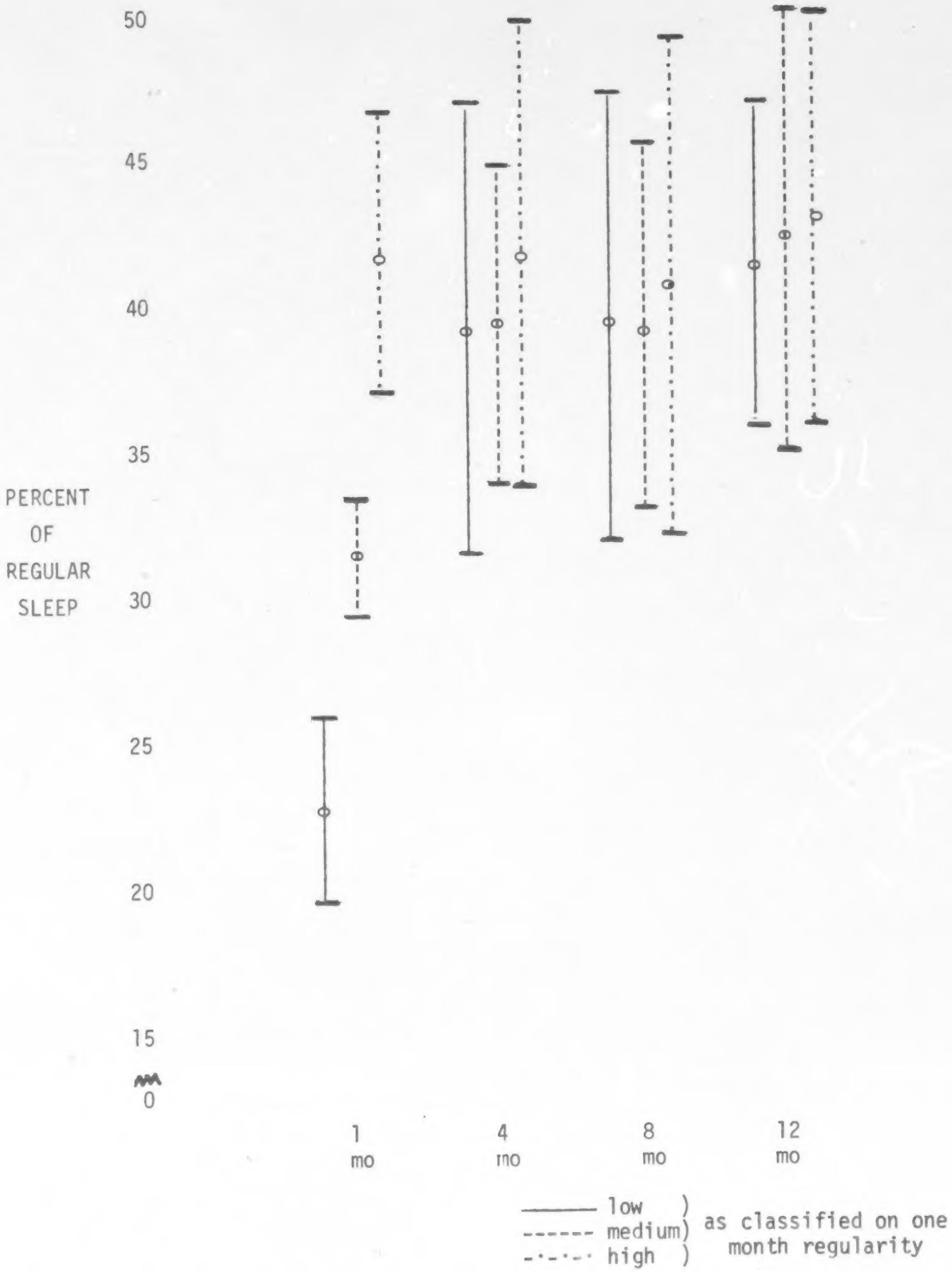

Figure 8.2 Means Plus and Minus One Standard Deviation for Regularity of Sleep During Infancy

infants at 1 month of age. Their mean percents of regular sleep were 23, 31, and 42 respectively. By 4 months of age, however, the three earlier groups were more similarly distributed with means of 39, 40, and 42 percent. Some babies begin infancy with fairly regular sleep patterns, others achieve them with the passage of time. Still others remain irregular with only one-third or less of their sleep at predictable times by 1 year of age. The same assessment instrument which produced these group data can be used to evaluate an individual case in a disrupted household or with an irritable, fretful infant to determine what remedial actions might be helpful.

In this project we have emphasized assessing infant characteristics which are most likely to influence the environment in which children develop, those attributes which most probably elicit positive or negative responses from the caretakers on whom they depend for care, stimulation, and socialization. This tack seems even more logical to us than when we began since those measures of developmental status per se we did try during infancy were highly unstable. The environmental context during the early flexible, adaptive period of childhood continues to be the most promising and viable approach in our view. The issue of consistency and stability over time is discussed at more length later in this chapter.

## Predictive Validity

At 1 year of age our study children showed optimal status, almost without exception, on all the dimensions of development which were measured. As discussed in Chapter 7, other investigators have found a similar lack of variability in early developmental testing and have suggested that a few years of life must pass before exposure to the environment is expressed in such testing. Typically children become more diverse in their abilities at older ages and group developmental data begin to show associations with family characteristics. We too expect to see a larger range in the developmental status of our study children as they are followed in subsequent years. Until these differences are expressed we can not judge the theoretical or practical usefulness of our earlier findings on the basis of their power to predict.

Meanwhile, the indications are that our data are sensible in relation to other findings in the field of child development. For example, in other longitudinal research using the Home Stimulation Inventory (Elardo _et_ _al_., 1975) the HSI scores from infancy were substantially predictive of 3 year Stanford-Binet results. The same HSI scores, however, were only moderately correlated with earlier developmental test scores at 1 year of age. The relationships between our HSI scores and the 1 year Bayley MDI are very similar to those from the study by Elardo _et_ _al_., as shown in Table 8.2.

Also in line with findings from other studies are our correlations between maternal years of schooling and the various types of assessment measures (Table 8.3). In general, maternal education shows more association with the mother's behavior and the home environment than with infant behavior during infancy. During teaching interaction, for instance, mothers with more schooling gave more positive feedback and were better facilitators of learning. (The literature showing similar findings is cited in Chapter 4.) The babies, however, could not be distinguished on their attentiveness and involvement in learning on the basis of their mothers' level of education. As discussed earlier, children routinely do not show differences in infant tasks related to development by socioeconomic indicators.

Most of the Pearson coefficients in Table 8.3 are moderate. The highest is .51 for the total HSI score. Yet the overall pattern is consistent with

## TABLE 8.2

### COMPARISON OF CORRELATIONS[1] BETWEEN HOME STIMULATION INVENTORY SCORES AT DIFFERENT AGES AND 12-MONTH BAYLEY MDI WITH THOSE REPORTED BY ELARDO ET AL (1975)

| | Our Sample | | | Elardo *et* *al*. | |
|---|---|---|---|---|---|
| | Age of HSI | | | Age of HSI | |
| Home Stimulation Inventory Subscales | 4 mo. | 8 mo. | 12 mo. | 6 mo. | 12 mo. |
| Emotional and Verbal Responsivity | .069 | .002 | .103 | .093 | .176 |
| Avoidance of Restriction and Punishment | .117 | -.147* | .189* | .039 | -.008 |
| Organization of Environment | -.075 | .022 | .088 | .263 | .241 |
| Provision of Appropriate Play Materials | .039 | .127 | .267* | .067 | .353* |
| Maternal Involvement with Child | -.049 | .035 | .176* | -.003 | .218* |
| Opportunities for Variety in Daily Stimulation | .065 | .129 | .196* | .158 | .054 |
| Total Score | .046 | .041 | .257* | .156 | .252* |

[1] Pearson r

*$p < .05$

TABLE 8.3

## PEARSON CORRELATIONS BETWEEN ASSESSMENT VARIABLES AT SPECIFIED PERIODS AND MOTHER'S YEARS OF SCHOOLING

| Assessment | | Time of Assessment | | | | | |
|---|---|---|---|---|---|---|---|
| | | AP | NB | 1 | 4 | 8 | 12 |
| Life Change | | --- | -.09 | -.10 | -.12* | -.05 | -.08 |
| Mother's Rating of Own Health (low=good) | | --- | --- | --- | -.06 | -.16* | --- |
| Mother's Psychosocial Assets | | .10 | --- | .07 | .02 | .13* | .06 |
| Parent Mutuality | | --- | --- | .30* | --- | --- | .15* |
| Father Involvement | | .24* | --- | .13* | .14* | .26* | .23* |
| Mother Involvement | | --- | --- | .02 | -.08 | -.06 | -.07 |
| Developmental Expectations (high=late) | | -.19* | --- | --- | --- | --- | --- |
| Neonatal Perception Inventory (high=positive) | | --- | -.12 | .01 | --- | --- | --- |
| Mother's Concerns | | --- | --- | .07 | .18* | .14* | .27* |
| Achievement Expectations | | --- | --- | --- | --- | --- | .29* |
| Ordinal Risk Score | | --- | -.10 | --- | --- | --- | --- |
| Gestational Age | | --- | .06 | --- | --- | --- | --- |
| Minor Anomaly Score | | --- | -.01 | --- | --- | --- | --- |
| Brazelton | | | | | | | |
| Deviant Score | | --- | -.08 | --- | --- | --- | --- |
| Habituation | | --- | -.11 | --- | --- | --- | --- |
| Alertness | | --- | .01 | --- | --- | --- | --- |
| Irritability | | --- | -.07 | --- | --- | --- | --- |
| Motor | | --- | -.12 | --- | --- | --- | --- |
| Sleep/Activity Record | | | | | | | |
| Feedings per day | | --- | --- | .15* | .04 | .06 | .04 |
| Longest day sleep | | --- | --- | -.13 | .09 | -.13 | .02 |
| Longest night sleep | | --- | --- | .01 | .07 | .16* | .03 |
| Night awakenings | | --- | --- | -.15* | -.16* | -.12 | -.10 |
| Regularity of feedings | | --- | --- | .02 | .08 | .09 | .15 |
| Regularity of night sleep | | --- | --- | .19* | .09 | .23* | .03 |
| Regularity of day sleep | | --- | --- | -.16* | .17* | -.14 | -.11 |
| Regularity of all sleep | | --- | --- | .06 | .17* | .19* | -.03 |
| Child's Temperament | | --- | --- | -.12 | .02 | -.19* | -.07 |
| Developmental Profile | | | | | | | |
| Physical | | --- | --- | --- | --- | -.14* | -.12 |
| Self Help | | --- | --- | --- | --- | -.04 | -.01 |
| Social | | --- | --- | --- | --- | -.19* | -.05 |
| Academic | | --- | --- | --- | --- | .03 | .07 |
| Communication | | --- | --- | --- | --- | -.13* | .01 |
| Home Stimulation Inventory (Caldwell) | | | | | | | |
| I. Emotional & Verbal Responsivity | | --- | --- | --- | .29* | .38* | .36* |
| II. Avoidance of Restriction and Punishment | | --- | --- | --- | .23* | .33* | .33* |
| III. Organization of Temporal Environment | | --- | --- | --- | .24* | .28* | .18* |
| IV. Provision of Appropriate Play Materials | | --- | --- | --- | .34* | .33* | .33* |
| V. Maternal Involvement with Child | | --- | --- | --- | .31* | .39* | .33* |
| VI. Opportunities for Variety in Daily Stimulation | | --- | --- | --- | .11 | .23* | .24* |
| Total Score | | --- | --- | --- | .43* | .51* | .46* |
| Teaching Interaction | | | | | | | |
| Positive Messages | Easy | --- | --- | .25* | .20* | .34* | .26* |
| | Hard | --- | --- | .22* | .19* | .27* | .19* |
| Negative Messages | Easy | --- | --- | .11 | -.04 | -.01 | -.14* |
| | Hard | --- | --- | .18* | .00 | -.26* | -.30* |
| Techniques | Easy | --- | --- | .14* | .06 | -.02 | -.15* |
| | Hard | --- | --- | .06 | .05 | -.02 | -.20* |
| Facilitation | Easy | --- | --- | .14* | .18* | .30* | .31* |
| | Hard | --- | --- | .22* | .21* | .30* | .21* |
| Infant Readiness to Learn | Easy | --- | --- | .05 | -.04 | .08 | .13 |
| | Hard | --- | --- | .04 | .05 | .03 | .00 |
| Feeding Interaction | | | | | | | |
| Mother's score | | --- | --- | .23* | .19* | .39* | .19* |
| Infant's score | | --- | --- | .09 | -.13 | .15* | .12 |
| Mother-Infant Communication | | --- | --- | .18* | .08 | .32* | .28* |

* $p < .05$    A = 158, E = 7.4, 0 = 80.

what we expected and indicates that the aspects of the environment which we assessed may eventually be potential explanations for relationships between child development and maternal education.

### Screening versus Assessment

Earlier in this report we drew some distinctions between screening and assessment procedures. They were helpful to us in differentiating between the primary evaluation process which identifies groups with a high probability and the need for subsequent secondary evaluation in more depth. We are not yet at the point where we can recommend screening and assessment combinations for evaluating child health and development. Partly this is because we do not know the predictive validity of our variables for identifying eventual problems. It is also due to the fact that the major focus of the methods which we have utilized in this study is more pertinent to the second stage of information-gathering which requires professional skills for observation and interpretation.

We do believe, however, that the information from our research will contribute to achieving screening capability in the future. Specifically, one of the requirements for being able to screen and intervene early is a knowledge of the natural history of the problem, i.e., the early signs or characteristics which predict undesirable outcomes (Frankenburg and Camp, 1975). Our data have longitudinal descriptive value in respect to that requirement. Meanwhile, other pieces of the picture are needed: other types of populations should be described which might be in more urgent need of screening and assessment. We could logically expect that the signs, precursors, and high risk characteristics for negative child outcomes would differ somewhat among various social and cultural groups. These diversities will need to be a part of our working knowledge before any impact on health care can be maximized.

One of the approaches we took to devising screening methods was the use of "simple" versus "complex" measures. For example, we asked mothers about the activity levels of their children. When these responses were compared with the activity levels rated by the home observers, there was little relationship. The "simple" maternal ratings of child temperament did not conform to those obtained from lengthier questionnaires; the two pieces of information were different. There were only moderate correlations between the simpler Developmental Profile and the more complex psychometric testing with the Bayley Scales. These and other bits of evidence have led us to mistrust the interchangeability of information obtained by different methods. The overall content and the means used to elicit it changes the meaning of the results. The question of which meaning (e.g., parent reporting versus observation by an outsider) is most helpful in predicting problems will have to await our long-term follow-up.

### Comparison with Traditional Assessments

While we were assessing our study families most of them were receiving regular ongoing health care which also involves clinical assessment and interpretation of potential problems. It was important to ask whether we were obtaining information which supplemented that routinely obtained, whether we were identifying different children with potential problems, or whether our assessments were redundant of concerns which were already expressed by the regular health caretakers. In order to answer this question we utilized the reports of concern by the children's primary health caretaker (physician or nurse practitioner) at 12 months of age; these concerns were about perinatal conditions, physical health, development, environment, health practices, or congenital abnormalities. We classified the children by whether concern was expressed in any area believing that, even though the area of concern might not strictly match our own, it would motivate monitoring and follow-up by the care system. Then we identified the mothers and infants lowest in our distribution of environmental measures; Table 8.4 shows the number of these low scorers who had already been recognized as cause for concern. In general, less than half of the families have aroused the concerns of their children's caretakers. This is some evidence that we are obtaining somewhat different information which could lead to different care or care for more children. Testing the validity of these comparisons will, of course, have to await the follow-up data.

## THEORETICAL ISSUES

### What Happens During the First Year?

Since the inception of the Nursing Child Assessment Project, we have struggled with the problem of conceptualizing the mother-infant interaction, and the environment in which it occurs, in a way that will be not only accurate, but will lend itself to good observation and assessment. At the outset of the study we suggested the formulation in Figure 1.3 (page 1.41). This very general model still has many attractive features about it. It guided our selection of variables to observe or assess, and still in many ways underlies our thinking. From a temporal point of view--that is, observing what happens over time--it is still not a bad description of what we think happens. We still assume that the child and the mother both enter into their interaction with preexisting styles, and other characteristics which affect the quality of the resulting interaction, which in turn (we presume) affects long-range outcomes for the child.

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## TABLE 8.4

## LOW ENVIRONMENTAL MEASURES COMPARED TO CONCERN BY THE PRIMARY HEALTH CARETAKER AT 12 MONTHS

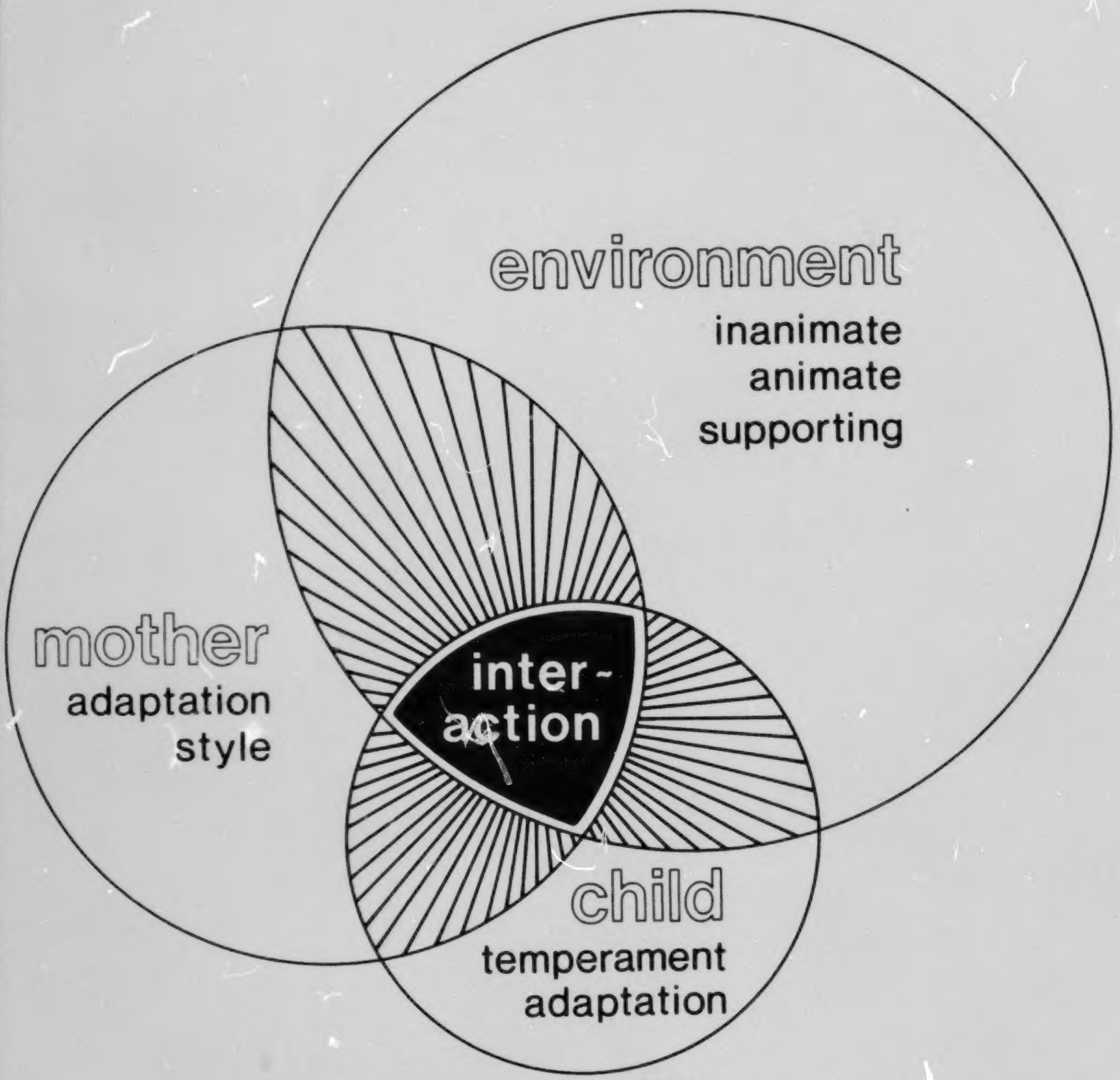
| Environmental Assessment at 12 Months | Score | N | Number of Low Scorers with Some Concern by Caretaker |
|---|---|---|---|
| Maternal Facilitation | ≤ 3.25 | 7 | 3 |
| Infant Readiness to Learn | ≤ 3.25 | 9 | 5 |
| Total HSI | ≤ 29 | 10 | 4 |
| Maternal Feeding | ≤ 29 | 11 | 4 |
| Infant Feeding | ≤ 24 | 11 | 4 |

But this model does not work as well when we are trying to take a slice of time and examine the full range of experiences an infant is exposed to at any one moment in interaction with his world and with the people around him. A second model seems a better description of the forces at work in the ongoing interactive situation. This second model is shown in Figure 8.3. What we are attempting to describe here is a dynamic interaction. What enters into the interaction at any moment is the infant and whatever momentary or long-term characteristics he may bring, the inanimate environment--space, materials, toys, sounds, richness or deprivation-- and beyond this, the animate environment. As we have explored the animate aspect of the interaction we have come to divide the mother's behavior and stimulation into two facets: (1) her presumably enduring stylistic characteristics, such as her tendency to be verbal or nonverbal, and her tendencies to use positive or negative feedback; (2) her momentary adaptation to the infant's demands and needs.

Finally, we have come to see this parent-infant interaction influenced by the overall supporting environment of the parents. Who else lives in the home? Is the father (or mother) employed? Are there relatives and other supportive people close at hand, or is the family psychologically or physically isolated from others? Is there enough money? And so on. These are part of what we called "life circumstances" in the earlier model, but they seem to us to create an overriding milieu in which all the interaction takes place. One of the interesting questions raised in this research, which we have not as yet fully answered, is the impact of varying life circumstances on the nature and quality of the interaction between infant and parent.

The areas of overlap in Figure 8.3 represent the actual interaction

Figure 8.3 INTERACTIVE MODEL


environment
inanimate
animate
supporting
mother
adaptation
style
inter-
action
child
temperament
adaptation

between parent and child at any given moment. It is meant to reflect the fact that the particular features we see in an interaction are assumed to be affected by all of these different components.

In analyzing and exploring the results from the first year of the study, we have generally followed this second model. We have focused primarily on four aspects and related questions:

1. The infant's characteristics or "temperament": Is there evidence that infants have consistent "temperamental" differences? Primarily our measures here were reports from the mother, but we also had ratings of the infant during the feeding and teaching.
2. The mother's enduring style: Is there any indication that mothers have enduring style at all? If so, in what areas? How do such style characteristics interact with infant characteristics, or other variables?
3. The adaptation of the mother to the infant (and of the infant to the mother): Is there evidence that some mothers are more skilled at this adaptational process? What "type" of mothers and infants achieve this "better" adaptation or level of mutuality?
4. The general life circumstances of the mother: What are the support systems available to the mother(father's involvement, other psychological support)? What has been the level of life change experienced? And how do these factors affect or relate to the adaptation level achieved between mother and infant?

We have focused less on explorations of the inanimate environment, in part because our attempts to assess this have been less successful. The only very good measures we have of this come from three scales of the Caldwell Home Stimulation Inventory: Organization of Physical and Temporal Environment

(#3), Provision of Appropriate Play Materials (#4), and Opportunities for Variety in Daily Stimulation (#6). Since we did not use the HSI at 1 month, our ability to trace this aspect of the interaction is somewhat weakened, but we will come back to this question when we can.

In the pages to follow, we will explore the adequacy of this general conception of mother-infant interaction in two ways. First, at any one age (1 month, 4 months, 8 months, or 1 year), can we describe the behavior of mother and infant adequately with this model? That is, can we detect the separate elements, and do they relate to one another in ways that we would suppose they should? Second, is there some consistency over the first year in the patterns that mothers and infants show? Obviously determining whether there are any persisting maternal styles requires exploration of this sort of cross-time consistency. But we were also interested in seeing whether there were some mothers and infants who were consistently more able to adapt to one another, and in whether there were persisting infant characteristics as well.

Let us begin with the first of these questions. How well does the overall model fit the data at each age?

## One Month Synthesis

You have already seen some of the relationships among individual variables in earlier chapters in this report, so you may already have some sense of the pattern of findings. But to explore all the separate facets simultaneously, the best technique appeared to be factor analysis. Three separate analyses were done, one for variables describing the infant, one for variables describing the mother, and one for the two sets of data combined. We want to emphasize that these analyses are in the nature of exploration and hypothesis generation. We did have a general theoretical model we were "testing," and the factor analyses provide a way of doing this. But since the combined mother-infant analysis involves more variables than are entirely justified by the number of our subjects, the findings must be seen as tentative, and our conclusions from those findings equally so at this stage.

The factors, and loadings, for each of the three analyses at 1 month, are presented in Table 8.5[1]. At this age, there is only one major factor for the infant, which might be thought of as an infant temperament dimension. On one end of the continuum are infants who are relatively inactive and happy, with regular feeding schedules; on the other end are the more active and fussy infants, who eat less regularly. At this same age there are three factors emerging from the measures of mother's behavior. Factor 1 seems to reflect difficulty vs. ease with the infant. Some mothers are concerned about their infants, have difficulty with feeding, and perceive them as being less good than average, while for other mothers the more favorable cluster of perceptions holds. The second factor includes variables emerging from the teaching task, and seems generally to reflect the mother's facilitation of the child's learning. Mothers who are high on this factor are comfortable in the teaching task, arrange the infant and the materials well, are sensitive and positive toward the child. Such mothers could be said to be adaptive to their infants' need during the teaching.

The third maternal factor contains two summary scores from the feeding task, and like the first two seems to describe a dimension of adaptation to the infant during feeding. Of interest is the fact that the teaching and feeding measures do not load on the same factors at this age; this suggests that skill at adapting to an infant's needs is different in the two settings.

---

[1] Items included loaded at ≥ .30. Only the teaching items for the easy task were included.

## TABLE 8.5

## ONE MONTH

**Infant Variables Alone**

| Factors | Loadings |
|---|---|
| 1 Active-Unhappy vs. Passive-Happy | |
| Activity | -.70 |
| Displeasure | .65 |
| Regularity of feedings | .38 |

**Maternal Variables Alone**

| Factors | Loadings |
|---|---|
| 1 | |
| Concerns re infant | -.79 |
| Ease of feeding | .72 |
| Perception of infant | .33 |
| 2 | |
| Facilitation | .69 |
| Comfort | .46 |
| Allowance for exploration | .43 |
| Negative messages | -.41 |
| Positive messages | .37 |
| 3 | |
| Mother-infant communication | .81 |
| Feeding score | .79 |

**Mother & Infant Variables Combined**

| Factors | Loadings |
|---|---|
| 1 Mutual Facilitation | |
| Facilitation (M)[2] | .78 |
| Readiness to Learn (I) | .71 |
| Positive messages (M) | .47 |
| Displeasure (I) | .42 |
| Comfort (M) | .34 |
| Verbalizations (I) | .33 |
| Allowance for exploration(M) | .30 |
| 2 Mutual Adaptation | |
| Maternal feeding score (M) | .85 |
| M-I communication (M) | .77 |
| Infant feeding score | .46 |
| Positive messages (M) | .33 |
| 3 Feeding Problems | |
| Ease of feeding (M) | .81 |
| Concerns re infant (M) | -.72 |
| 4 Psychosocial Assets | |
| Life changes (M) | .57 |
| Mother's temperament (M) | .56 |
| Psychosocial assets (M) | -.55 |
| Feelings re feeding (M) | .42 |
| Infant's temperament (I) | .39 |
| Verbal style (M) | -.31 |
| Positive messages (M) | -.30 |
| 5 Active-Unhappy vs. Passive-Happy | |
| Activity (I) | -.76 |
| Displeasure (I) | .61 |
| Regularity of feedings (I) | .31 |
| 6 Perception of infant (M) | .66 |
| Infant's temperament (I) | -.41 |

## TABLE 8.6

## FOUR MONTHS

**Infant Variables Alone**

| Factors | Loadings |
|---|---|
| 1 | |
| Readiness to learn | .83 |
| Success | .69 |
| Displeasure | .62 |

**Maternal Variables Alone**

| Factors | Loadings |
|---|---|
| 1 | |
| M-I communication | .81 |
| Feeding score | .77 |
| Emotional responsivity | .44 |
| Feelings re feeding | -.35 |
| 2 | |
| Techniques | .61 |
| Negative messages | .61 |
| Verbal style | .57 |
| Positive messages | .46 |
| 3 | |
| Ease of feeding | -.77 |
| Concerns re infant | .76 |
| 4 | |
| Psychosocial assets | -.64 |
| Health rating | .48 |
| Life change | .33 |

**Mother & Infant Variables Combined**

| Factors | Loadings |
|---|---|
| 1 Mutual Facilitation | |
| Readiness to learn (I) | .87 |
| Facilitation (M) | .69 |
| Success (I) | .65 |
| Displeasure (I) | .61 |
| Comfort (M) | .40 |
| 2 Mutual Adaptation | |
| Maternal feeding score (M) | [illegible] |
| M-I communication (M) | .80 |
| Infant feeding score (I) | .58 |
| Emotional responsivity (M) | .46 |
| Mother involvement (M) | .31 |
| Feelings re feeding (M) | -.30 |
| 3 | |
| Positive messages (M) | .66 |
| Activity (I) | .55 |
| Verbalizations (I) | [illegible] |
| Techniques (M) | .38 |
| Verbal style (M) | .31 |
| 4 | |
| Concerns re infant (M) | .78 |
| Ease of feeding (M) | -.76 |
| 5 | |
| Regularity of feedings (I) | .72 |
| Feeding permissiveness (M) | -.50 |
| 6 | |
| Negative messages (M) | .76 |
| Techniques (M) | .40 |
| Avoidance of restriction | -.36 |

## TABLE 8.7 EIGHT MONTHS

**Infant Variables Alone**

| Factors | Loadings |
|---|---|
| 1 Developmental Level | |
| Social age | .72 |
| Communication age | .65 |
| Self-help age | .59 |
| Academic age | .49 |
| Physical age | .45 |
| 2 | |
| Readiness to learn | .77 |
| Success | .70 |
| Displeasure | .43 |
| 3 | |
| Regularity of feedings | .68 |
| Regularity of all sleep | .67 |
| Temperamen | -.37 |
| Activity | -.34 |

**Maternal Variables Alone**

| Factors | Loadings |
|---|---|
| 1 Adaptation | |
| Feeding score | .81 |
| M-I communication | .79 |
| Emotional responsivity | .58 |
| 2 | |
| Concerns re infant | .76 |
| Ease of feeding | -.71 |
| 3 | |
| Techniques | .77 |
| Positive messages | .35 |
| Verbal style | .33 |
| 4 | |
| Maternal involvement | .67 |
| Provision of play materials | .66 |
| Emotional responsivity | .48 |
| Organization of environment | .38 |
| Facilitation | .30 |

**Mother & Infant Variables Combined**

| Factors | Loadings |
|---|---|
| 1 Mutual Adaptation | |
| M-I communication (M) | .85 |
| Maternal feeding score (M) | .78 |
| Emotional responsivity (M) | .63 |
| Positive messages (M) | .35 |
| Infant feeding score(I) | .35 |
| 2 Mutual Facilitation | |
| Readiness to learn (I) | .68 |
| Facilitation (M) | .64 |
| Comfort (M) | .60 |
| Success (I) | .59 |
| Allowance for exploration(M) | .51 |
| 3 Infant Developmental Level | |
| Social age (I) | .74 |
| Communication age (I) | .62 |
| Self-help age (I) | .60 |
| Physical age (I) | .48 |
| Academic age (I) | .46 |
| 4 | |
| Regularity of feedings (I) | .74 |
| Regularity of all sleep (I) | .72 |
| Feeding permissiveness (M) | -.32 |
| 5 | |
| Concerns re infant (M) | .78 |
| Ease of feeding (M) | -.69 |
| 6 | |
| Variety in stimulation (M) | .68 |
| Mother involvement (M) | .49 |
| Infant feeding score (I) | .33 |
| Life change (M) | -.31 |
| 7 | |
| Infant health rating (I) | .65 |
| Father health rating (M) | .51 |
| Mother health rating (M) | .41 |

## TABLE 8.8 TWELVE MONTHS

**Infant Variables Alone**

| Factors | Loadings |
|---|---|
| 1 Developmental Level | |
| Communication age | .80 |
| Social age | .69 |
| Self-help age | .67 |
| Academic age | .65 |
| Physical age | .43 |
| 2 | |
| Readiness to learn | .78 |
| Success | .69 |
| Displeasure | .39 |

**Maternal Variables Alone**

| Factors | Loadings |
|---|---|
| 1 Adaptation | |
| M-I communication | .88 |
| Feeding score | .85 |
| Emotional responsivity | .64 |
| Maternal involvement | .47 |
| Allowance for exploration | .32 |
| 2 | |
| Provision of play materials | .54 |
| Organization of environment | .53 |
| Life change | -.52 |
| Variety in stimulation | .52 |
| Maternal involvement | .38 |
| 3 | |
| Ease of feeding | -.75 |
| Concerns re infant | .64 |
| Feelings re feeding | .43 |
| 4 | |
| Techniques | -.75 |
| Negative messages | -.37 |

**Mother & Infant Variables Combined**

| Factors | Loadings |
|---|---|
| 1 Mutual Adaptation | |
| M-I communication (M) | .86 |
| Maternal feeding score (M) | .82 |
| Emotional responsivity (M) | .61 |
| Infant feeding score (I) | .58 |
| Maternal involvement (M) | .48 |
| 2 Mutual Facilitation | |
| Readiness to learn (I) | .79 |
| Success (I) | .71 |
| Negative Messages (M) | -.58 |
| Techniques (M) | -.52 |
| Facilitation (M) | .49 |
| Displeasure (I) | .46 |
| Comfort (M) | .40 |
| 3 Infant Developmental Level | |
| Communication age (I) | .83 |
| Self-help age (I) | .71 |
| Social age (I) | .68 |
| Academic age (I) | .62 |
| Physical age (I) | .40 |
| 4 | |
| Organization of environment(M) | .59 |
| Life change (M) | -.56 |
| Variety in stimulation (M) | .50 |
| Provision of play materials (M) | .45 |
| 5 | |
| Ease of feeding (M) | -.75 |
| Concerns re infant (M) | .62 |
| Feelings about feeding (M) | .45 |
| 6 | |
| Regularity of feedings (I) | .92 |
| Organization of environment (M) | .30 |
| 7 | |
| Positive messages (M) | .51 |
| Techniques (M) | .44 |
| Verbalizations (I) | .43 |
| Organization of environment (M) | .30 |

By far the most interesting relationships emerge when the mother's and the child's scores are factored together. The "facilitation" factor here is the first one, and contains only scores from the teaching situation. But what seems to us to be critical here is the fact that the child's readiness to learn in the teaching situation is an important variable in this factor. Those mothers who are sensitive, have good timing, and are positive have infants who are ready to learn, who verbalize, and who signal pleasure in the interaction. These infants seem to be giving off very clear and positive signals to the mother, and she is able to respond to these signals with behavior which facilitates the child's learning.

The second mother-infant factor includes primarily scores from the feeding interaction, but once again the infant's responsiveness to the mother during feeding is important in the factor. Here, as with the first combined factor, there is a reciprocal relationship. High levels of "adaptive" behavior occur when both mother and infant are adaptive.

Three separate factors--the third, fifth, and sixth--seem to reflect aspects of the infant's state or temperament. Factor 3 includes information about the mother's perception of the ease of feeding, and her concerns, if any, about the infant. At this age (and at every age, as we will see) infants who are difficult to feed are those whom the mothers are worried about. Similarly, factor 6 tells us that mothers who see their infants as better than average also perceive the infant's temperament as better than average. The fifth factor includes those items which clustered together in the infant-only factor analysis and seem to reflect some aspect of the infant's temperament.

Finally, factor 4 is an interesting amalgam which is somewhat close to our "life circumstances" conceptualization, although measures from other sources appear here as well. Mothers with high life change and poor assets also perceive themselves as having more difficult temperament, are less positive toward the infant, and less verbal toward the child.

Overall, this clustering fits our initial model reasonably well. The infant's state is reflected in several places; there is something of a cluster of variables which we originally thought of as life circumstances; and there is good evidence of mother-infant mutuality in both factors 1 and 2. There is less clear evidence of maternal "style" here, however, although that aspect of mother's behavior is more properly explored as a question of continuity over time than as a status variable at any one time point. So there are indications that each of the separate influences we originally suggested has some impact on the behavior of the mother and the infant. But what is particularly interesting here is the lack of a single, major, first factor including all of these elements. There is no indication here that high levels of facilitation or adaptation, for example, occur only if there are good psychosocial assets, or only if the infant is perceived as better than average. The mother's psychosocial assets and her perception of her infant form separate clusters and do not seem to affect, at least as we have measured them, the interactions between the two during the feeding or teaching. At least at 1 month, the interaction between mother and infant seems to be heavily influenced by the infant's state of temperament and his readiness to learn, and these are more momentary, or more variable, phenomena.

## Four Month Synthesis

The same three factor analyses were performed at 4 months, with the results presented in Table 8.6. Again there is only one infant factor, but the elements of the single infant factor have changed between 1 and 4 months.

At 1 month, the defining variables seemed to be related primarily to the infant's state or temperament; at 4 months the factor seems, instead, to represent a task orientation. So in those three months. physiological state has become less critical in differentiating among infants, while their approach to the novel tasks in the teaching interaction has become more critical.

The four factors emerging from the analysis of the maternal variables at 4 months match our original model almost perfectly. Factor 1 seems quite clearly to be an "adaptation" factor, that is, it includes those measures which reflect the mother's sensitivity and responsiveness to the infant's needs and signals. The second factor seems equally clearly to represent aspects of maternal "styles," since it includes those variables we suggested initially as measures of style, including the verbal/nonverbal nature of the mother's communications, her specific teaching techniques, and her positive or negative approach. Curiously, however, this factor seems to be differentiating between mothers who do a lot of things--talk a lot, give lots of positive and negative messages, and who run through a repertoire of teaching techniques--and those who do very few things. So there is an"overstimulation" facet to this behavior; at 4 months, mothers seem to be differentiated in terms of their general level of activity or intrusiveness with the infant.

The third factor at 4 months is virtually identical to factor 3 at 1 month, and reflects the combination of difficulty with feeding and worries or concerns about the infant. Babies who are hard to feed elicit concern in their mothers at 4 months, as they did at 1 month.

The final maternal factor at 4 months obviously reflects the elements of life circumstances we had identified originally. The dimension represented in the factor includes, at the negative end, mothers with poor psychosocial assets, a high rate of life change, and poor health--at least as they perceive their own health.

In this instance, the facets of the mother-infant interaction which we suggested in our original conceptualization are clearly represented in the factors emerging from the analysis of the maternal variables. Again, however, it should be noted that these several elements tend not to load together on factors, suggesting that these facets are somewhat independent of one another.

The combined mother-infant factor analysis, also presented in Table 8.6, is again the most interesting of the three. If you compare the combined analysis at 1 month, and now at 4 months, there are some striking similarities. The first factor, in both analyses, includes items from the teaching interaction, and could again appropriately be called "facilitation." Again the mother's sensitivity to the infant during teaching, and the infant's readiness to learn, combine to describe a sort of "successful mutuality" which occurs in some families and not in others. Whether the infant's readiness to learn is the critical variable is not clear, of course, since these are contemporaneous measures. But at least we can see here that generally successful interactions on the part of the mother occur most often when the baby _is_ involved in the task.

The same general conclusion can be drawn from the second factor, which again is strikingly similar to the second factor at 1 month. This is a "feeding factor" in some sense, since the mother's total sensitivity to the infant during feeding, and the infant's responsiveness during that interaction, are critical variables in the factor. But one of the measures from the Home Stimulation Inventory (HSI), the "emotional responsivity" of the mother, also loads with this factor at 4 months. (It should be noted that since the HSI was not obtained at 1 month, this is the first age at which any

HSI scores appear in the analysis.) Also included here is the score of "Mother involvement" which was obtained from the interview with the mother. It reflects the mother's perception of the amount of time she spends with the child, including time teaching the child. So what is shown in this factor is, on the one end, a sensitive, involved, emotionally warm and responsive mother interacting during feeding with a child giving off good signals. The causality, once again, cannot be determined from these data; but the mutuality is striking.

Factor 3 at 4 months also includes scores from both the child and the mother, this time scores from the teaching interaction. Active infants who are verbalizing relatively more during the teaching have mothers who are more positive, more verbal, and use more techniques. This seems to describe a high intensity interaction, as opposed to more placid or low-keyed interactions occurring between the less active and verbal infants and their mothers.

The fourth factor at 4 months, and the third factor at 1 month, are virtually identical; both reflect the mother's perception of her infant as well as her concerns about him. Feeding scores are also prominent on the fifth factor, although this factor seems not to say very much about mutuality. Rather, what is reflected here is the amount of scheduling and "regimentation" in the feeding situation. On one end of this continuum are mothers who are non-permissive in the feeding situation--they like feeding at regular times, with little mess, and they want the infant to eat all that has been prepared. The other end of the continuum includes the more permissive mothers who tend to use a demand schedule, and are more laissez-faire about the feeding interaction itself.

Finally, the sixth factor, which includes elements from both the HSI and the teaching situation, reflects a negative-non-negative dimension. Mothers high on this factor are more negative during teaching, use more techniques (which may reflect greater intrusiveness), and are more restrictive in the home environment.

Two things are striking about these factors. First, the similarity between the factor structure at 1 and 4 months is notable, particularly in the first two (the major) factors. Second, the major factors include both infant and maternal scores, a fact which underlines once again the point we have made repeatedly: what emerges in any interaction between mother and child is a joint function of what each brings to it. It is for this reason that we have included the word "mutual" in the label for each of the first two factors.

### Eight Month Synthesis

The results of the three factor analyses are presented in Table 8.7. At 8 months three factors emerge among the infant variables. The first factor is an overall "developmental age" factor, based on scores from the Developmental Profile. Since this instrument was first used at 8 months, this factor could not appear at 1 or 4 months. The second infant factor at 8 months is an almost perfect match to the single factor at 4 months, and once again seems to represent some aspect of task-involvement during the teaching. Finally, some element of infant temperament appears at 8 months in the third factor. The dimension represented in this factor runs from easy, relatively passive or inactive infants with regular body rhythms on the one end, to the more active, more difficult and irregular infants on the other. This factor bears some similarity to the "State" factor at 1 month.

The first three maternal factors at 8 months, although reshuffled somewhat in order, are very similar to the first three factors at both 1 and 4 months. Once again there is an "adaptation factor," including scores from the feeding assessment and the HSI (Factor 1); once again there is a factor reflecting the mother's concern about her infant (Factor 2); and once again there is a "maternal style" factor, which seems to reflect, in part, the level of the mother's involvement in the teaching interaction. Finally, there is one new factor at 8 months which is primarily an HSI factor, although the mother's level of facilitation during teaching also loads here. This seems to reflect the well-organized, sensitive mother in several domains, and may describe inanimate environmental stimulation too.

The combined mother-infant factor analysis at 8 months also is quite similar in structure to the analyses from 1 and 4 months. The mutual adaptation factor, which was the second factor at 1 and 4 months, at 8 months is now the most prominent factor. This factor includes measures from three separate data sources: the feeding observation, the teaching interaction (Positive messages), and the HSI. All the elements of this factor reflect warm, positive, responsive sensitivity to the child, *matched by* clear signals and responsiveness on the part of the child during feeding.

Factor 2 at 8 months is the same "mutual facilitation" factor which appeared as the first factor at 1 and 4 months. Again it includes the mother's sensitivity and timing (Facilitation) and the child's readiness to learn in the teaching interaction. Factor 3 in the combined analysis is virtually identical to the first infant factor; it includes only scores from the Developmental Profile. What is interesting here is that although this cluster of scores represented the *first* factor among infant scores, it does not account for a major portion of the variance in the combined analysis. Furthermore, none of these scores loads significantly on either the adaptation or facilitation factors. So whatever it is that an infant brings to the feeding or teaching interaction that makes possible the higher levels of mutuality between mother and infant, the infant's overall perceived developmental level seems not to be critical, at least not at this age.

Of the remaining factors at 8 months, the most interesting is factor 6, which includes one score from the HSI (variety in stimulation), one score from the interview of the mother (mother involvement), one score from the feeding interaction (infant feeding score), and one score from the Holmes Life Change assessment. Here for the first time we see the level of life change entering into a mother-infant factor. In some respects, this factor seems to reflect environmental organization vs. disorganization. Mothers who are high on this factor offer varied daily stimulation and are more involved with their infant but there is low life change. So while there is variety, there is also stability. And these are the mothers whose infants are the most responsive and adaptive in the feeding interaction.

## Twelve Month Synthesis

Once more we have carried out three factor analyses, for the infant variables, the maternal variables, and the two combined. These are presented in Table 8.8. The factor structure for the infant variables at 12 months is virtually the same as at 8 months, except that only the first two factors account for significant portions of variance. Again we find that the child's developmental age describes the first factor, and his readiness to learn and involvement in the teaching task describes the second factor.

The maternal factors at 12 months are somewhat different from the 8-month results although the same elements are included. Factor 1 at 12 months is, once more, the "maternal adaptation" factor, and includes the same variables as at earlier ages--with the addition of one new variable from the HSI (maternal involvement), and one new variable from the teaching interaction (the mother's allowance of the infant's exploration of the task materials). This cluster of variables continues to be the most consistent over the 12-month period, and quite regularly contains variables from more than one data source. While the feeding scores represent, at each age, the defining variables in this factor, other elements from both the HSI and the teaching interaction appear as well. What seems to be reflected here is a pervading quality of responsiveness on the part of the mother, again matched by responsiveness on the part of the infant.

At 12 months the "teaching factor" drops to fourth position, and the second factor reflects some aspects of organization vs. disorganization of the environment. Four HSI scores load on this factor, along with Life Change. So the dimension is from an organized, rich, stable environment on one end to a more disorganized, less rich, and less stable environment on the other.

Factor 3 is the now familiar factor reflecting the mother's concerns about the infant. Once again, the infants with concerned/worried mothers are those who are the most difficult to feed. Clearly the feeding situation is a highly salient element of the daily interaction of mother and infant; if something is wrong with feeding, the mother is likely to be worried about her baby--and this is true at every age.

The final maternal factor at age 12 months includes only scores from the teaching scale, but here, for the first time, there is a fairly clear "negative intrusive" vs. "non-negative permissive" dimension. Some mothers use a lot of techniques (which we might see as "pushy [illegible] intrusive") and relatively more negative messages; other mothers use fewer of both.

When the mother and infant scores are combined in a single analysis at 12 months, very familiar patterns emerge. Once more the mutual adaptation factor accounts for the largest portion of the variance, and once again there is a "mutual facilitation" factor second. This second factor, however, has changed in composition in interesting ways. At 8 months, those infants who were most ready to learn and had the greatest success in the teaching task, had mothers who were high in facilitation (sensitivity, timing and organization of the task and materials), and who allowed exploration. At 12 months, the infants who are ready to learn, and are successful, are those whose mothers are not negative, and use few techniques. These same mothers are also more facilitative, but the absence of certain maternal behaviors seems for the first time to be more critical. This makes sense when you think of the sort of changes in the infant that have occurred between 8 and 12 months. The 12-month-old infant is now much more independent, and wants much more independence. Mothers who attempt to dominate the interaction by criticism and lots of techniques do not succeed in teaching the task; rather the child seems to reject these control attempts, and in the process rejects the task. One possible implication of this configuration is that a mother who has some "natural" or "stylistic" tendency toward criticism or other negative messages may do just fine during the first eight months, but will experience significant clashes with the child at 12 months. Negative style seems for the first time at 12 months to interfere with the child's learning (his success), and with his motivation to learn ("readiness to learn").

Factor 3 at 12 months is the same as factor 3 at 8 months: a Developmental Age factor. It seems significant that again these scores do not load on the other major interactive factors.

Factor 4 in the combined analysis at 12 months is similar to factor 6 at 8 months, and to the second factor of the maternal analysis. It seems appropriate again to label this Organization vs. Disorganization or Stability vs. Instability. The significant element in this factor, other than the measures from the HSI, is the presence of the Life Change score. Mothers who have successfully organized the child's environment, and who provide richness in play materials are those who experience more stable life experiences. When life change is high, both the richness of the environment and the organization of it decline.

### Overview of the Age Analyses

What conclusions may we draw, at this stage, about the structure of mother-infant interaction at the several ages we studied? Several conclusions seem reasonable.

First, and most important, at every age it is the interaction of mother and infant behaviors which is critical. In the factor analyses, when mother and infant variables are factored together, the major factors include both mother and infant measures. Successful mutuality seems to require that both partners come with certain qualities--readiness to learn or clear signalling on the part of the child, sensitivity and adaptiveness on the part of the mother. When either of these is missing, a successful "dance" does not occur.

Second, our findings do not support a conclusion that some mother-infant pairs are "better" or "more mutual" across situations than others. While a few measures from the teaching and feeding observations do load on the same factors, by and large the two assessments emerge as quite independent of one another. Mother-infant pairs who are highly mutually adaptive during feeding may or may not show similarly high mutual involvement and facilitation during teaching. How may we interpret this apparent lack of generality? There are several possibilities. First, it may be that our measurement in one or both settings is simply invalid. The teaching interaction, for example, was very brief, and it may be that it represents an inadequate sampling of this type of mother-infant interaction. Although we cannot reject this possibility out of hand, we do want to point out that other researchers, studying brief samples of teaching interactions between mothers and their older children (e.g., Hess and Shipman, 1967, 1965, 1968; Hess, Shipman, Brophy, and Bear, 1969) have found the resulting scores to be predictive of the child's concurrent and subsequent intellectual performance, both on tests and in schools. So the use of teaching interactions as assessments of both maternal style and mother-child interaction patterns has been shown to have some predictive validity in the past. It is possible, of course, that the observation of teaching, while valid for older children is simply not valid for infants. Longitudinal results from our own study should help to answer this question.

Alternatively, the apparent lack of generality of mother-infant mutuality may arise because optimum interaction is by nature a fairly fragile thing, heavily influenced by situational factors, changes in the child's state, or stress on the mother. The feeding interaction is at the least a familiar situation, and the mother and infant may have developed relatively stable patterns of relating to one another during feeding. The infant's state will affect it, as would any temporary stresses on the mother, but we may be tapping somewhat more enduring features of the mutuality. The teaching interaction, on the other hand, is a novel situation for most mother-infant pairs. This is not to say that mothers do not at other times teach their infants specific behaviors; clearly they do. But in the teaching interaction which we set up the mother was asked to teach a specific thing, one she had not encountered before. This places some stress on her, since she may feel pressure to succeed at the task. Since the interaction is brief, the child's initial state or involvement in the task also becomes more critical. These situation-specific factors affect the quality of the resulting interaction and hence the scores we obtain. The modest correlations between scores obtained on the "easy" and "hard" tasks during the teaching is also evidence on the same point. So the demands of the teaching and feeding tasks are different, and the mothers' relative ease in the two situations probably also differed. All of this does not necessarily mean that the two "bits" of information--from the teaching and from the feeding--are not both of interest in long-range prediction. One may tell us something about the relatively enduring qualities of mutuality between mother and infant, and the other something about the mother's ability to respond to inattention by the child as well as to her own stress or anxiety. Both of these may be predictive of aspects of later interaction or later functioning on the part of the child. In particular, the qualities the mother demonstrates in the teaching interaction may be of greater importance as the child gets older, and as more of the mother's time is spent in attempts to shape the child's behavior directly.

Whichever explanation one chooses, the fact remains that there is not good generality of interaction patterns across measurement situations. No doubt the meaning of this finding will become clearer as the longitudinal assessments progress.

A third general conclusion to be drawn from the analyses of each age is that our original theoretical model was not a bad first effort. The several elements we thought would be important parts of the mother-infant interaction do appear in one form or another at the several ages. But the four elements do not combine very much. For example, the quality of mutuality or non-mutuality seems not to be very heavily affected by life circumstance.

Two additional comments about the model seem in order at this point. First, at no age does the infant's physical status or temperament relate strongly to the quality of the interaction between mother and infant. While at every age there was some factor which related at least tangentially to "infant temperament," or developmental status, the measures of such qualities in the infant do not load with the measures of mother-infant interaction. So whatever it is that the infant brings with him to the interaction, or whatever it is that the mother responds to in the infant, (as measured by the HSI, or by observations of feeding or teaching) his physical or developmental status seem not to be critical. It is possible that infant temperament would have been a more prominent variable in our analysis had we used a full Carey Questionnaire, instead of the few questions about infant temperament we did use. But as we measured it, infant temperament is not affecting the mother's relationship with the infant in significant ways. The infant's readiness to learn has an effect, but not his physical or developmental status. Since infant readiness to learn has an association with the interaction, it is appropriate to recall, as reported in Chapter 3, that the infant's alertness score from 2 days of age correlates with the measure of readiness to learn at 1, 4, 8, and 12 months. The significant correlations range from -.10 to -.14. This means that infants showing less alertness at 2 days showed less readiness to learn in the teaching situation.

Second, our model suggests that there are some pervasive "stylistic" qualities of mothers that they bring to any interaction with their infant.

The sort of analysis we have presented thus far doesn't tell us anything about the consistency of mothers, over time, in their approaches to the tasks we gave them. But we have found that precisely the same clusters of "stylistic" variables do not occur at each age. If mothers had persisting, dominant styles of interaction, we might have expected to find more similar factor loadings for those variables we considered to be measures of style, such as the tendency to be verbal or nonverbal, to be negative or positive. Instead we have found that the particular aspects of maternal style elicited at each age seem to vary, presumably depending on the developmental qualities of the infants. For example, 12-month-olds are more likely than are 4-month-olds to call forth negative messages from mothers who have negative tendencies; so negative messages emerges as a major element in the factor structure at 12 months, and not at 4.

As a final point about the factor analyses at each age, we want to emphasize the quite remarkable similarity from age to age. The same two principal factors occur at each age, and many of the minor ones recur as well. This stability of pattern suggests that the elements of "successful" mother-infant interaction stay the same over the first year. What these analyses do not tell us, however, is whether it is the same mothers over time. Is it the same group of mother-infant pairs who are high on the "mutual adaptation" factor at each age? Can we identify some persistently "successful" pairs, and some with persisting communication problem?

## CONSISTENCY OVER TIME

Certainly the fact that the factor structure is so similar from one time point to the next suggests that the individual subjects may also be consistent over time. But it is critical for our own thinking, and for the problem of predicting and assigning of risk, to know more precisely just how consistent the subjects are, and in which ways.

We have approached this problem in three ways. First, we looked again at the cross-age correlations on individual variables. These correlations have been presented in the various relevant chapters already, so this is not new information. In Table 8.9 we have combined the findings from these sources into a single presentation.

In examining the figures in Table 8.9, bear in mind that all of these correlations are Kendall taus; equivalent Pearsons would be somewhat higher, particularly for the HSI correlations, which are higher to begin with. But even allowing for this point, it is clear that there is only modest consistency at best. The individual HSI scales, over the three time points we measured them, show slight consistency; the mother's emotional responsivity and her provision of opportunity for variety in daily stimulation show the greatest consistency. The total HSI score, however, is by far the most stable measure of all those obtained. So there is something about the overall behavior of the mother with her child and her organization of the environment that persists over time.

Data from our own two types of direct observation of mother and infant (the feeding and teaching scales), however, do not suggest strong consistency. While many of the correlations are significantly positive, their size is small. Among these measures the most consistent are the mother's concerns about the infant, the father's involvement with the child, the total feeding score, and the measures of positive messages during the teaching task. There is some indication that the measures from the hard task are more consistent than those from the easy task, perhaps because the level of stress was more nearly similar across the hard tasks. But in any case the correlations are very small.

## TABLE 8.9

## CONSISTENCY OF VARIABLES OVER TIME[1]

| | 1 & 4 months | 1 & 8 months | 1 & 12 months | 4 & 8 months | 4 & 12 months | 8 & 12 months |
|---|---|---|---|---|---|---|
| Maternal Variables | | | | | | |
| Mother's concerns about the infant | .20* | .12* | .16* | .22* | .13* | .27* |
| Father's involvement | .20* | .18* | .23* | .26* | .22* | .22* |
| Total Feeding score | .26* | .21* | .13* | .24* | .15* | .14* |
| Caldwell #1: Emotional responsivity | --- | --- | --- | .33* | .29* | .29* |
| Caldwell #2: Avoidance of restriction | --- | --- | --- | .25* | .31* | .31* |
| Caldwell #3: Organization of environment | --- | --- | --- | .21* | .13* | .26* |
| Caldwell #4: Provision of appropriate play materials | --- | --- | --- | .24* | .21* | .27* |
| Caldwell #5: Maternal involvement with child | --- | --- | --- | .19* | .16* | .24* |
| Caldwell #6: Opportunity for variety in daily stimulation | --- | --- | --- | .28* | .27* | .48* |
| Total Caldwell score | --- | --- | --- | .44* | .39* | .44* |
| Positive Messages: Easy | .17* | .28* | .12* | .23* | .13* | .24* |
| Positive Messages: Hard | .24* | .28* | .13* | .22* | .10* | .25* |
| Negative Messages: Easy | .14* | .21* | .07 | .01 | .06 | .09 |
| Negative Messages: Hard | .06 | .15* | -.01 | .15* | .08 | .17* |
| Techniques: Easy | .05 | .07 | -.15* | .08 | .02 | .01 |
| Techniques: Hard | .11* | .13* | .14* | .17* | .21* | .16* |
| Facilitation: Easy | .15* | .07 | .12* | .16* | .07 | .18* |
| Facilitation: Hard | .09 | .12* | .14* | .17* | .12* | .03 |
| Verbal Style: Easy | .24* | .09* | -.05 | .17* | .11* | .08 |
| Verbal Style: Hard | .28* | .17* | .11* | .23* | -.06 | -.03 |
| Psychosocial Assets | .14* | .20* | .18* | .24* | .00 | .07 |
| Mother involvement | .07 | .08 | .10 | .07 | .07 | .01 |
| Infant Variables | | | | | | |
| Total Feeding score | .05 | .06 | .05 | -.03 | .06 | .14* |
| Readiness to learn: Easy | .13* | .10* | .03 | .02 | .03 | .11* |
| Readiness to learn: Hard | .08 | .05 | .17* | .07 | .13* | .06 |
| Displeasure: Easy | .08 | -.01 | -.02 | .19* | -.05 | .03 |
| Displeasure: Hard | .02 | .10 | -.03 | .06 | -.06 | .00 |
| Verbal score: Easy | .02 | .05 | .18* | .00 | -.08 | -.03 |
| Verbal score: Hard | .07 | .12* | .04 | .16* | .03 | .04 |
| Success: Easy | .02 | .04 | -.20* | -.05 | .02 | .02 |
| Success: Hard | .02 | -.07 | -.01 | .08 | .14* | .06 |
| Activity: Easy | .05 | .06 | .04 | -.10* | .03 | .08 |
| Activity: Hard | .07 | -.02 | .02 | -.03 | .04 | .07 |
| Child's Temperament (rated by mother) | .33* | .21* | .20* | .15* | .27* | .27* |

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[1] Kendall Correlation Coefficients

*$p < .05$

A = 183, E = 9, 0 = 100.

The assessments of the infant show even less consistency over time (Table 8.9). Except for the measure of the child's temperament, which was rated by the mother, there is no measure of infant behavior which shows consistency over time. Mothers perceive some consistency in temperament in their infants, but our measures of the infant's own behavior do not show this.

These are discouraging findings, especially in view of our initial conceptualization of persisting maternal "styles" of interaction with the infant and persisting infant temperament. These findings, with a few exceptions, do not point to any kind of persisting styles. Some mothers are somewhat more consistently positive than others, but this is very nearly the only "stylistic" variable one can argue for.

Because the issue of consistency seemed to us to be sufficiently critical, we were not willing to stop at this point, but wanted to explore further. Two strategies were used. First, we asked ourselves how many individual mothers (or infants) were in the same half of the distribution on a given variable at all four measurement points. This is a very weak form of consistency, but it might tell us something about the number of mothers who showed particular patterns. Second, we explored the consistency over time in factor scores for the "mutual adaptation" and "mutual facilitation" scores. Since these two factors appeared at every age, reflecting mother-infant interactive patterns, we thought it would be useful to ask whether it was the same pairs on the high or low end of this continuum at every time point. The results from these two analyses are presented in Tables 8.10 - 12.

We did not perform the consistency analysis shown in Table 8.10 for every variable; rather we selected variables which seemed to show some consistency in our first analysis, or about which we had some interest, and

TABLE 8.10

CONSISTENCY OVER TIME FOR SELECTED MATERNAL AND INFANT VARIABLES

| Variable | Total N* | Percent of subjects in top half of distribution: | | | Percent of subjects in bottom half of distribution: | |
|---|---|---|---|---|---|---|
| | | all 4 time points | 3 of 4 times | 2 of 4 times | 3 of 4 times | 4 of 4 times |
| Chance Level | | 6.25 | 25.0 | 37.5 | 25.0 | 6.25 |
| Total feeding score: mothers | 109 | 17.4 | 20.2 | 26.6 | 24.8 | 11.0 |
| Positive messages (easy task) | 130 | 3.8 | 23.8 | 26.2 | 23.8 | 22.3 |
| Mother-infant communication during feeding | 152 | 13.8 | 30.3 | 29.6 | 15.8 | 10.5 |
| Negative messages (easy task) | 103 | 4.9 | 18.4 | 26.2 | 31.1 | 19.4 |
| Facilitation cluster score (easy task) | 136 | 8.8 | 21.3 | 30.9 | 25.7 | 13.2 |
| Infant feeding total score | 109 | 6.4 | 22.0 | 32.1 | 27.5 | 11.9 |
| Infant readiness to learn (easy task) | 136 | 5.9 | 22.1 | 33.1 | 30.1 | 8.8 |

| Variable | Total N* | Percent of subjects in top half of distribution: | | Percent of subjects in bottom half of distribution: | |
|---|---|---|---|---|---|
| | | 3 of 3 times | 2 of 3 times | 2 of 3 times | 3 of 3 times |
| Chance Level | | 12.5 | 37.5 | 37.5 | 12.5 |
| Emotional responsiveness (HSI subscale 1) | 156 | 25.6 | 28.2 | 28.8 | 17.3 |

*N includes only those subjects with data at all time points.

## TABLE 8.11

### CORRELATIONS ACROSS TIME POINTS OF THE "MUTUAL FACILITATION" FACTOR SCORE[1]

| | 4 mo. | 8 mo. | 12 mo. |
|---|---|---|---|
| 1 month | .14* | .05 | -.02 |
| 4 month | | .01 | .03 |
| 8 month | | | .07 |

[1] "Mutual facilitation" is the first factor at 1 and 4 months and the second factor at 8 and 12 months.

## TABLE 8.12

### CORRELATIONS ACROSS TIME POINTS OF THE "MUTUAL ADAPTATION" FACTOR SCORE[1]

| | 4 mo. | 8 mo. | 12 mo. |
|---|---|---|---|
| 1 month | .20* | .27* | .12 |
| 4 month | | .23* | .15* |
| 8 month | | | .27* |

[1] "Mutual adaptation" is the second factor at 1 and 4 months and the first factor at 8 and 12 months.

checked to see if there might be some "hidden" consistency. There is some, but not very much. In the case of the total feeding score for the mothers, there are more mothers than chance would suggest who are consistently in the top half of the distribution at every time point, and slightly more than chance numbers in the bottom half at every time point. Instead of 12.5 percent of the subjects showing one or another of these types of consistency (which would occur by chance), 28.4 percent are consistent in these ways. From the point of view of prediction, we may want to look further, at later assessment points, at the 11 percent of the sample who are in the bottom half of this "adaptation" dimension consistently, compared to the 17.4 percent in the top half consistently.

In the case of both positive and negative messages, what consistency there is occurs among mothers who are in the bottom half of each distribution at every time point. Almost one-quarter of the sample is consistently non-positive, while nearly one-fifth are consistently non-negative. Insofar as there is any "stylistic" consistency on these variables, then, it is reflected not in the persistent presence of particular behaviors, but in their absence. Some mothers consistently use very little negative evaluation, some consistently use very little positive. These are not, incidentally, the same mothers. We do not have here simply some mothers who give little evaluation of any kind; rather they are selectively silent. Bear in mind that even with this rather weak criteria for consistency over time, there is still not a vast amount of consistency; but the pattern is interesting.

Similarly modest, but interesting, levels of consistency appear when we correlate the "mutual facilitation" and "mutual adaptation" factor scores over the four time points (Tables 8.11 and 8.12). Despite the stability of the factor structure for the "mutual facilitation" factor over time, there is essentially no consistency in this cluster, while for the mutual adaptation factor, there is slight consistency.

## DISCUSSION

Let us begin by summarizing the overall findings.

1. The factor structure both for maternal variables or infant variables alone, and for the two combined, shows considerable stability over time. The same two factors are the first ones in the mother-infant analysis at every age.
2. Both the principal factors, at every age, include items from both the mother and the child, and suggest that some aspects of mutuality are critical at every age. That is, at every age, the dimensions which most clearly differentiate among the families are those which reflect the quality of mother-infant interaction. At any age, one can identify some pairs that adapt well to each other in feeding, others that adapt well to each other in teaching.
3. At no age are the "adaptive" families emerging from the feeding situation the same families who appear to be most adaptive during teaching. So there is something highly situation specific about these measures.
4. The most adaptive families--on either cluster--at one age, may or may not be the most adaptive families at another age. There is, at best, only very weak consistency over time on any of the variables, or clusters or factors of variables. The "mutual adaptation" score emerging from the feeding interaction is modestly consistent, as are some of the component scores which make it up, but the correlations are low.

Where does this leave us in understanding the nature of the interaction between mother and infant during the infant's first year of life? Our original conceptual model suggested that what we observed between mother and infant would be a joint function of at least four things: the infant's entering state (physiological and temperamental), the mother's persisting styles of interaction, the mother's psychosocial assets or stress, and the ability of the pair to adapt to one another. Judging from the results thus far, there are some weaknesses in this model.

The infant's entering state does seem to have an effect on the interaction between mother and infant. Those feeding interactions in which the infant gives clear signals and is responsive to the mother's cues are those in which the mother is more responsive as well. So the ability of the pair to adapt to one another seems to be, in part, a function of the child's capacities and ongoing state. In the teaching situation, the mother's facilitation skill is partly predicted by the child's readiness to learn, which is in part a state variable. So this much has some validity.

At 8 and 12 months, there is some hint that the mother's psychosocial assets, in particular the level of life change she is experiencing, begins to have some impact on her ability to enter constructively and sensitively into interaction with her infant; there is little indication of it at earlier ages.

There is a weak indication that some mother-infant pairs adapt more readily to one another than do others; the correlations across time in the factor scores on the "mutual adaptation" factors are significant and positive, although small. So there is some suggestion of "adaptive" and "non-adaptive" families. Given shifts in the mother's psychosocial assets or stress over time, and changes in the infant's state, we would not expect the adaptation score to be perfectly consistent over time; there are too many short-term influences that will have an impact on this score. But the fact that there is some consistency does suggest that some pairs have a greater likelihood of "waltzing together" regularly.

The weakest part of the model is in the area of "maternal style." There is *very* little indication that mothers have any persisting habits or stylistic approaches in their interactions with their infants. As we mentioned earlier, this is an unexpected finding. There is a good deal of discussion in the literature of maternal style (e.g., Hess & Shipman, 1965, 1967, 1968; Hess, Shipman, Brophy, and Bear, 1969; Bee *et al*., 1969; Streissguth and Bee, 1972; Steward and Steward, 1973 and 1974) and some evidence that measures of maternal style are predictive of the child's cognitive performance. The assumption, in all of the literature on style, is that these are persisting or pervasive qualities of maternal interaction. Other researchers who have explored mother-infant interaction, particularly those concerned with prediction of later IQ (e.g., Yarrow, Klein, Lomonaco, and Morgan, 1975; Bayley and Schaefer, 1964; Tulkin and Covitz, 1975; Kagan, 1971; Kagan and Moss, 1962; and others) have typically attempted to identify dimensions of maternal behavior, and there is a clear built-in assumption that they are sampling from or rating generalized maternal tendencies. But our data seem to show that this is not the case, at least not in any very potent fashion. How are we to make sense of this?

First, have other researchers, looking at consistency in maternal or infant behavior, found clear evidence of persisting maternal or infant style or temperament? This seems to be an obvious and easy question, but it is not. There is a great paucity of relevant information. Kagan and Moss report some quite sizeable correlations between ratings of maternal behavior at several time points (Kagan and Moss, 1962, p. 209), but the age periods are very broad, and the scores at each time period represent a summary judgment of all observations taken during that time period. For example, time period 1 runs from birth through age 3, and a single rating was made for this entire period of the mother's restriction, protection, hostility and acceleration. Correlations between these ratings for time period 1, and the same ratings for time period 2 (3-6 years) are moderately high, although inconsistent. Generally, as the child gets older, the mother's behavior seems to become more stable.

Somewhat closer to our own procedure is Yarrow's longitudinal study of mother-infant interaction. Detailed observations of mother-infant interaction were obtained when the infants were 6 months old, and then more structured observations were made again at 19 months. Unfortunately the same variables were not used to describe the maternal behavior at the two time points, but the maternal measures were inter-correlated. When this is done (Yarrow, Klein, Lomonaco and Morgan, 1975), the finding is again of a moderately weak consistency. Correlations between the mother's "facilitating activity" at 19 months and the 6-month measures were positive but not statistically significant, nor, generally, were those between "negative reinforcement" at 19 months and earlier maternal behavior. The single 19-month maternal dimension which was significantly correlated with early maternal behavior was positive reinforcement, and here the correlations were quite substantial. For example, positive reinforcement by the mother when the infant was 19 months old correlated .72 ($< .01$) with "contingent response to positive vocalization" at 6 months. The fact that it is positive reinforcement which is the more stable behavior is consistent with our own findings, although the size of the correlation in the Yarrow et al. study is much higher.

Other longitudinal studies which have found significant correlations between early maternal behavior and later child intellectual functioning (Bayley and Schaefer, 1964; Tulkin and Covitz, 1975) have either not collected more than one measure of maternal behavior, or have not reported consistency data.

Consistency in infant behavior is reported by several researchers, most notably by Kagan (1971). He observed infants in a variety of settings designed to elicit information about the infants' "tempo." Infants' smiles, latency to respond and length of fixation on pictures and other stimuli, fretting and crying, and infant vocalizations were all coded at 4, 8, and 13 months. The results are somewhat similar to ours in that only very low levels of consistency over time was obtained on most measures. There was no indication that some children consistently smiled more than others, or fretted more, or vocalized more at all time points. On the other hand, Chess and Thomas (1973) have found considerable consistency in children's placement in broad categories of temperament.

Overall then, the literature suggests that for both mother and infants there is likely to be consistency over time in broad categories of behavior, but relatively little for specific behaviors.

In accounting for our own finding of low consistency, we are left with several alternatives. On the one hand, it could be that there is "real" consistency in maternal behavior, but that we have simply not measured it very well. There may be underlying styles which are simply not well reflected in the brief observations, and the somewhat imprecise scales we used. On the other hand, it may be that there really isn't anything very much that could be called "maternal style," over and above the general tendency, which the HSI measures, to provide rich or non-rich environments to the child.

There may be some weak tendencies, but they may be overwhelmed by the momentary variations in the mother's state or mood and the child's state or temperament.

A third possibility is that mothers have some tendencies, some collection of likely responses, but that the specific behaviors elicited will depend on the child's momentary behavior, or current developmental status. So the repertoire of maternal behaviors may be fairly stable, and somewhat different for individual mothers, but the particular behavior we observe at any one point will be only a part of the repertoire. The fact that there is a kind of "negative" consistency in both negative and positive messages suggests that some mothers simply do not have these behaviors in their repertoires, or that if present in the repertoire, they have very low "habit strength."

It is difficult to believe that there are no persisting qualities of mother-infant interaction. We do know from numerous studies that what mothers do with their infants at 6 or 8 months of age predicts later intellectual performance of the child to some extent. Tulkin and Covitz (1975), for example, found the Peabody IQ at age 6 quite strongly correlated with a number of measures of mother-infant interaction when the child was 6 months old. Mothers who held their infants frequently, entertained them, and provided many objects for the infant had children who at age 6 had higher Peabody scores. Language scores (ITPA) at age 6 were also predicted by 6-month interactions. Generally speaking, the aspects of 6-month interaction which are most predictive have to do with duration of the mother's involvement, richness or variety of inanimate stimulation, and some aspect of the mother's play with or entertainment of the infant. Similarly, Elardo, Bradley, and Caldwell (1975) found that those aspects of the mother's behavior at 6 months which were the best predictors of the child's 3-year IQ were the appropriateness and variety of the play materials or experiences and the overall organization of the environment. The amount of maternal involvement with the child was also predictive. At 12 months, those maternal behaviors most predictive of 3-year IQ were again the appropriateness of the play materials provided, the maternal involvement with the child, and the mother's emotional responsiveness to the child. Yarrow and his associates (1975) also found that the observational scores obtained at 6 months were reasonable predictors of later child behavior, although in this case the IQ score was less well predicted than was a 19-month measure of the child's exploratory tendencies. Those infants who showed the most creative and persistent exploration of materials at 19 months had had mothers who provided higher levels of social and kinaesthetic stimulation at 6 months.

It is difficult to believe that these results would occur if there were no stability in the mother's behavior. All these researchers assume that they are merely sampling some pervading aspects of maternal behavior and environmental organization, and the fact that the early scores predict later behavior lends credence to this assumption. All of which leads us to assume that there must be a higher level of maternal consistency than we have obtained.

We are left with several conclusions:

1. There is "real" consistency in broad environmental and maternal characteristics, such as those measured in the HSI, and to a lesser extent measured in our "mutual adaptation" factor. Some mothers consistently provide more, and more appropriate, stimulation, and are warmer and more responsive to their infants. These same mothers are likely to achieve a

good level of mutual adaptation during feeding.

2. There is far less consistency in specific maternal behaviors such as verbal style, or positive or negative messages. Measures of such behaviors vary over time as a result of temporary changes in the infant's state, the mother's mood, the task demands, and the child's then-current developmental skills. Mobile infants call forth different behavior from most mothers from those of more physically stable infants; alert babies call forth different responses from most mothers from those of passive or quiescent ones.

3. Probably there are some persisting differences among mothers in the *repertoire* of behaviors they call upon in these different settings. Some mothers, regardless of the provocation, are less likely to use negative messages with their child than are others, and some are less likely to use positive messages. But these underlying differences in response tendencies are difficult to tease out, and still more difficult to use as a basis for prediction.

Finally, we want to emphasize once again that the most striking finding emerging from this entire summary analysis is that at every age, the most prominent dimensions of interaction between mother and infant are dimensions which describe *mutually* effective, or ineffective, patterns.

One last caution, before we leave the level of "theory" and go on to discuss the possible applications of our findings: bear in mind that the group of mothers and infants we have studied are on some important respects atypical. They have, as a group, received better health care than the norm, and show narrower variation on a number of variables than one would find by sampling randomly from a city population. This has several implications that must be borne in mind. First, the relatively low correlations we have obtained may be due, in part, to restricted variances. Had we studied a sample which included some more extremely "poor" families, we might well have increased the variance on a number of our variables, and hence increased the chance of higher correlations. Second, generalizing from our data will have to be done with caution. At the very least, some of the conclusions which we may draw now, and after the longitudinal follow-up of these families, will need to be rechecked with samples of minority families, and samples which include a greater proportion of poverty level families.

# CHAPTER 9

# APPLICATIONS

The ultimate goal of this project, determining the early predictors of child health and developmental problems, can be realized only when we have more information on the outcomes of our study children at older ages. Whatever these eventual findings may be, it has become clear to us that one of the main values in using screening and assessments techniques is their capability of sensitizing personnel. Those of us who have adopted the perspective underlying this work and have learned to use the assessment tools will never again be content merely to examine children, merely to focus on their care regimen, or merely to test their developmental capabilities. We are very mindful of the configuration of circumstances, attitudes, behavior, affect, perceptions and stimulation which interact to form the quality of their environment and to influence the comfort of parents in their role.

In any project of this type, the major question, "What is the applicability to practice?" must be addressed, for that is the whole point of our work. In this chapter we discuss some of the opportunities we have had for beginning practical applications of our methods. These include base-line assessments to help problem families and to improve the environment for children in a group care setting. In addition we undertook a field trial of screening protocols incorporated into traditional maternal child nursing services.

## HELPING FAMILIES WITH PROBLEMS

What is the utility of the assessment techniques in caring for families where problems already exist? Are they useful in determining how families can be helped?

We were asked by the Panel for Family Living in Tacoma, Washington, to participate with them in improving the quality of service for child abuse/neglect families in their community. Two of the project staff[1] assumed a small caseload as a demonstration of our methods and perspective; this provided a base for sharing ideas and for planning future care programs. The two nurses visited five families over a period of six months; the abused children in these families ranged in age from 3 to 10 months at initial contact.

All of the mothers had been separated from their infants at the time of birth due to prematurity, caesarean section, or an illness on the part of the mother or baby. The literature has documented the relationship between such postpartum separations and child abuse (Andrews, 1975). The lack of normal parent-child interaction is thought to be due to interference with bonding and attachment (Kennell *et al*., 1974). Therefore, the focus of the contacts with these five families was to enhance or recreate mother-infant bonding and attachment.

During the weekly or bimonthly visits to the homes the basic philosophy was to involve parents actively in the implementation of the plan of care as much as possible. From the beginning, agreement was reached with the mothers as to the degree of involvement that would be required of them, i.e., making and recording observations of the child's activities and carrying out certain activities with their children. The initial contacts made clear that no single method, tool or evaluation approach would provide the appropriate basis for an intervention program. So, the two staff members began to systematically use a number of assessment instruments and observations with each family; when they went into the home they had a specific yet flexible purpose to attain with the family. The primary goal was to assess systematically each mother-infant pair and provide feedback to both parents regarding the strengths and assets in the situation. This facilitated establishing rapport and recording progress while allowing the mother, who in all cases was the primary caregiver, a chance to experience a more positive, pleasant, and satisfying relationship with her child. In every instance an important part of the assessment was listening to and learning from the parents.

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[1] Charlene Snyder and Anita Spietz have reported this experience in: "Nursing Assessment and Intervention in Child Abuse Families," to be published in *Nurse Practitioner*.

The specific instruments used were:

1. Interviews
2. Feeding Scales
3. Teaching Scales
4. Home Stimulation Inventory
5. Infant Sleep-Activity Record
6. The Developmental Profile
7. Schedule of Recent Events.

The interviews, similar to those presented in Chapter 5, provided a picture of the parents' perceptions and concerns. The common problems encountered in this group of mothers focused on their infants' temperaments (mood, regularity, and adaptability). Retrospective information from the mothers showed that they had had few psychosocial assets during pregnancy. All the mothers reported a great deal of life change, and the picture seemed to be one of perpetual crises. These assessments helped us to know the factors impinging on the energy for child rearing and the specific areas in which supportive help was needed.

The baseline Home Stimulation Inventory showed that all homes were low in some area of environmental stimulation. Over the course of care the areas which showed the most improvement were "emotional and verbal responsivity" and "maternal involvement with the child."

The Developmental Profile showed low perceived skills for all of the infants. It provided an entree for suggesting specific play or interaction that mothers could provide to assist their children in increasing their developmental skills. One mother's 1-year-old was delayed in self-help skills; this mother was encouraged to allow the child to feed herself during the initial part of the feeding rather than at the end of the feeding time when interest and hanger had waned. This change brought positive results.

In order to observe the mothers' style of communication with their infants, we asked them to teach an age-appropriate task at each visit. In this particular group the mothers gave little or no positive feedback. Instead, they focused on the infants' mistakes and tended to be restrictive, not allowing exploratory behavior. The mothers were primarily nonverbal during the interaction. The infants, on the other hand, were attention the mothers' task help, seeming to enjoy the time playing together. This response made mothers feel that their efforts at teaching were worthwhile.

The teaching observation proved an easy vehicle for care. For example, if the mother didn't communicate to the infant about his behavior, the visitor suggested she praise him for his attempts or show some nonverbal feedback such as a hug or smile. One mother who stated earlier that her little boy didn't like her was encouraged to tell the child he did well. When she did so, he smiled at her and she exclaimed, "He does like me!"

The use of the teaching observation can be viewed as twofold. It demonstrates to parents that teaching/learning interaction is possible even with very young children. Most of these parents for instance thought their children were "too young to learn anything." Secondly, it is a practical way to facilitate and encourage parent-infant exchange; for those who say they don't know how to play with their babies they can be helped through the specific task to do so and to recognize the children's cues in the process.

The feeding observation also presented opportunities to identify problem areas in mother-infant interaction. For these families, feeding tended to be a task-oriented event rather than a social time. There was little stimulation through talking, looking or touching. The babies were held away from the mothers so that little warmth or security was communicated. There was also little affect or responsiveness by either member of the pairs. After the feeding the visitor discussed one or two behaviors which were helpful to the child's development. Over time the mothers worked on these to improve their communication with their babies.

Most of the mothers were concerned about their infants' sleep patterns, fussiness, and crying. To determine the extent of the problem they kept a record of the child's activities over several days (as discussed in Chapter 3). Three of the five infants did in fact have irregular cycles, waking during the night or fussing during the day. All of the infants became more regular with time; whether this was due to normal maturation or the mothers' changed behavior is unclear. It was apparent, however, that keeping the record did in itself provide some help to the families. Comments included, "He really wasn't as bad as I thought," and "After I started the record I learned his schedule."

The sleep record was also useful in indicating parental behaviors which were aggravating the problem and which could be modified. For infants who wakened at night, parents were encouraged to avoid rushing to them at the first sound but to allow some time for self-quieting. Mothers who were unfamiliar with normal infant sleeping sounds such as grunting would pick the baby up, believing him to be awake. This resulted in waking the baby from active sleep.

These families had many problems but this experience demonstrated that, using the guidelines of the assessments, there were ways we could help improve the developmental environment and make parenthood a more satisfying role.

## HELPING A DAY CARE CENTER

The usefulness of the environmental perspective and the supplemental utilization of assessment methods were also demonstrated by our experience in another type of setting. One of our staff members was asked to consult with the staff of a nearby day care which served a low socioeconomic population. The children were cared for in a good physical facility by an interested, conscientious group of teachers. All the teachers were high school graduates with children of their own; they had had no formal training in day care, however, and only a limited knowledge of normal growth and development. The director and her staff had concerns about some of the children's health and development and were eager to optimize the out-of-home care they provided.

Since the day care session ran from 7:30 a.m. to 5:30 p.m., two meals and one snack were served. Observation of a mealtime showed little interaction between the teachers and the children; the children ate alone at the table with the adults standing around eating and assisting the children when needed. This assistance was given quietly with little verbal interaction; most things were done for the children with little encouragement of the child's participation in the activity.

One of the director's major concerns was the care provided for toddlers (those under 3 years of age). There were two hours in the morning and two hours in the afternoon which were unscheduled; the remainder of the day was taken up with meals, naps, dressing, diapering, etc. Observation of the four unscheduled hours revealed a chaotic situation. The teachers spent that time comforting the crying and attempting to prevent the children from injuring one another.

Individual children of all ages were of concern to the teachers because of obvious developmental delays and a lack of follow-through at home in progressing at such things as weaning and toilet training. The techniques used to focus on individual children was the Developmental Profile (discussed in Chapter 5). The consulting project nurse taught the teachers how to assess the developmental skill level and how to plan specific activities to develop the child's ability in areas where they scored low for their age. A large chart was placed on the wall specifying, for each child, the current activity goals. This served as a helpful reminder and provided an opportunity to share information with parents. Later Developmental Profiles did indeed show the children to be functioning at more age-appropriate levels.

For some of the problems in the day care which influenced all the children the principles of our environmental assessments (Chapter 4) were applied to the group. Along the lines of our feeding scales the teachers were encouraged to join the table and make the time one in which the children could learn social and communication skills through adult exchange and responsiveness. Congruent with the dimensions of the teaching scales the need for facilitating learning, for giving positive feedback, and for developing independent mastery were stressed.

The Home Stimulation Inventory also provided a framework for improving the day care environment for the entire group. Unscheduled time turned into play with age-appropriate toys and exposure to broadening stimuli such as children's records of music and stories. The HSI was also utilized by the teachers on home visits, after instruction, to assess the children's home environments.

Of course, problems still remained for this day care population. No assessment method or care perspective is a formula for providing optimal developmental environments when social factors in the home sometimes work in opposition. Our experience does show, however, that the techniques from our project can be used to improve a group child care setting when people involved are committed to doing so.

## A FIELD TEST

The experiences described above were somewhat serendipitous opportunities for our project nurses to try the information-gathering methods. We still had many questions about their use in health care settings by personnel previously unfamiliar with them. Many nursing administrators and supervisors in the area were aware of the nature of our work and expressed an interest in the availability of our methods for possible implementation in their practice settings. Their interests complemented our own in setting up a small first feasibility trial of the screening/assessment techniques.

Four sites, two hospitals and two health department districts, collaborated with us in this field test. Their goals included improving perinatal family care through more sensitive, broader screening for problems and high-risk characteristics.

Personnel at those sites providing prenatal care wondered how they could best identify families who might benefit from more extensive supportive follow-up. Those giving newborn care wanted to systematize their observations in the labor and delivery room, the nursery, and the maternity ward to include family and interactional as well as infant characteristics. Those providing postpartum nursing care in the community were concerned about making optimal decisions about patient contacts, given limited staff resources.

Community health personnel also wanted to document the status of the population they served for programmatic purposes. Serious budgetary realities were increasingly restricting the maternal child services they could provide. To maintain or improve their resources they required evidence of the prevalence of needs for care.

In discussing current procedures in maternal child care in this locale another major common problem became evident: pertinent information often was not shared across care settings. For example, if it was determined that a family should be followed for care after maternity hospital discharge, a telephone call was usually made to the public health office serving that residential area. Some information about the family was forwarded by those familiar with them from the hospitalization. But this information was not systematically similar in content nor did it contain enough of the picture to establish any priority for home visitation. Rescreening then had to be done by telephone call to the mother, or if the family had no telephone, one home visit was made to evaluate the need for further care. Conversely, after home care was given, the hospital personnel often felt as though they had inadequate feedback to know the value of the referral or how problems were resolved. While the communication problems of multiple-agency care systems are complex and not easily solved, the use of a common information base seemed advantageous.

We wanted to gear our participation in the field test to meet the concerns and goals of the care agencies. In addition we wanted to find out:

a) the degree of ease or problems in incorporating screening into care settings with already established routines and priorities
b) the receptivity of the care personnel to the methods
c) the informal evaluations of the personnel after using them
d) any indications of changes they produced in practice behavior
e) whether patients were willing to provide the information as part of their care.

In addition, the summarized information would provide some comparisons with our study data for other types of patient groups.

It is important to emphasize that this field test was not a study per se; it was a first look at feasibility and potential problems. Care trials of the effectiveness of service using the screening/assessment techniques will be more appropriate later when the data base for considering validity is stronger. Meanwhile we had developed some impressions as to which dimensions were likely to be helpful in decision-making based on the existing literature and our experience with the study families.

The basic format for the field test, in addition to perinatal health status and level of maternal education, followed our basic conceptual framework, i.e., the characteristics of the infant's behavior; the characteristics of the parents' behavior; the parent-child interaction; and certain life circumstance elements such as the amount of life change.

a. In the prenatal period three types of information were obtained:

1) the degree of support the mother perceived she had available, both emotionally and physically,
2) the amount of life change she had experienced in the past,
3) her expectations of infant development such as the age babies see and hear.

b. At the time of labor and delivery the information was:

   1) any conditions that indicated a probable compromise of physiology for the fetus and newborn,
   2) characteristics of the infant, such as how he responded to stimuli in his environment and the maturity of his motor development,
   3) the mother's early perception of the infant and a description of the communication system between mother and infant in the early feeding process.

c. During the early postpartum period the important information was:

   1) a description of the mother's support system,
   2) the regularity of infant behaviors and the caretaking cycle,
   3) any problems or concerns the mother had.

The schedules for obtaining the information, as is appropriate for screening, were kept simple, requiring only minimal orientation as to the type of data needed and the methods for collecting them. Orientation sessions were provided by our project staff, but these did not include principles of decision-making or care processes. The more complex assessment methods with detailed observational scales were not introduced.

The agencies which cared for prenatal patients obtained their information through a questionnaire designed for the mother. The items were similar to those we used during our study.

At birth the nursery nurses participating in the field test at the two hospitals filled out a simple questionnaire that covered their observations of the newborn. They were asked to rate the baby's alertness, motor maturity, irritability, cuddliness, consolability, and to express any concerns they had about the baby. The first five items about the baby were from the Brazelton Behavioral Assessment using a simplified 3-point scale. Nurses in the postpartum unit were asked to observe the new mother feeding her baby and then to fill in a questionnaire about the mother's verbalizations to her infant, her tactile stimulation, her mood, the amount of visual contact she and the infant had, and the infant's motor activity. These items were simplified versions taken from our feeding scales. The new mother was also given a questionnaire to fill out which included the Neonatal Perception Inventory and the Schedule of Recent Events.

In telephone contacts the Public Health Nurses queried new mothers, using a structured interview, about their support systems and any current problems. The content and length of these contacts did vary somewhat according to the problems reported by the mothers. At this time they also mailed the mother a questionnaire regarding her perceptions of her baby and a chart to record the baby's sleep-wake pattern for one week. The purpose of this information was to help decide whether families needed further care contacts and what type might be beneficial.

After a two-hour orientation a small pilot test was done in each field test setting to make sure the whole staff understood the protocols and how to use them. After desirable modifications were made, they were to be used on all new patients in each setting for a two-week period in December, 1975. Table 9.1 shows the number screened by site and type of protocol.

We summarized the screening data and presented it in separate feedback sessions to the field test participants. They could then use it for program planning or documentation. Only some of the data are reported here to illustrate specific points. Our staff visited the field test sites periodically and these contacts provided additional insight for evaluating the experience. In addition, the care personnel who used the screening protocols were asked for their written evaluations and suggestions; many did not respond, however, so their reactions can not be presented quantitatively.

## TABLE 9.1

### NUMBER OF FAMILIES SCREENED, BY TYPE OF FORMAT AND FIELD TEST SITE

| Type of Format | Hospital A | Hospital B | Health District A | Health District B | Total |
|---|---|---|---|---|---|
| Prenatal | 39 | 5 | 9 | 0 | 53 |
| Newborn | | | | | |
| Infant Observation | 86 | 54 | - | - | 140 |
| Mother Questionnaire | 85 | 42 | - | - | 127 |
| Mother-Infant Feeding Observation | 67 | 35 | - | - | 102 |
| Referral Face Sheet | 85 | 42 | - | - | 127 |
| Postpartum | - | - | 16 | 38 | 54 |

*Incorporating Screening and Receptivity of Personnel*. The field test data show that these types of screening procedures *can* be incorporated into clinic, hospital and community care settings. For example, in one hospital there were 87 births during the testing period. Of these, 99 percent of the infants were screened by the nursery nurses and 77 percent of the dyads were rated on mother-infant interaction. In one health district 58 percent of the postpartum referrals were screened by telephone and 29 percent by a home visit for a total of 87 percent. In some settings, procedures were worked out whereby volunteers or clerks gathered the non-observational data.

Personnel receptiveness seemed the most critical issue in incorporating screening procedures. Of course, the receptivity varied from "wary," "attentive but noncommital" to "very pleased," "enjoying the experience." Some of the more experienced nurses thought the system might be helpful to new staff but they themselves preferred their usual ways of problem identification. Others were quite enthusiastic and could see the applicability to practice, such as providing a basis for parent teaching in child development or structuring the observation of mother-infant interaction so that they could better help mothers be more comfortable with it.

This variability in receptivity has to be expected in any innovation of new practice methods. There will always be personnel at all levels of the hierarchy who resist change in routines. Our observation was that the effect of this resistance is lessened if personnel at the immediate supervisory level believe in the potential worth of the innovation and are available on a direct ongoing basis to encourage, to explain, and to maintain participation.

Special contingencies also influenced the utilization of the screening formats in the field test. In one setting a new primary care system was being introduced; in another there was a sudden increase in the number of surgical patients on the postpartum floor, one location had several nurses on vacation; and some settings were occupied with budgetary problems. These occurrences naturally divert energy and attention to coping rather than to trying something new. On the other hand, if change waits for a smooth uneventful course, the chances are that changes in the perspectives as to who should receive more of different types of care will never be made.

As might be anticipated, a major response to the screening activities was "we're too busy." While this might have sometimes been an indirect reflection of discomfort in changing routines, it was evident that, in some settings, the ratio of personnel to the work to be done was overwhelmingly low. In these instances systematic screening dramatically pointed out the deficit in available resources more than it guided the use of existing ones.

For example, in one of the health districts the supervisor was very concerned about the needs of a special group receiving service from her office--the families receiving assistance from the Women, Infant and Children food supplement program. The WIC program provides food vouchers to families with young children qualifying through dietary and physical deficiencies due to the inability of the parent(s) to provide adequate nutrition. The families must attend the district office clinic monthly to determine continued eligibility for the program. During the field test the public health nurse who talked to the families on these monthly appointments utilized the screening formats for the mothers who were pregnant or postpartum. The mothers simply filled out the forms while waiting to talk to the nurse. Of those screened 78 percent said they would like to talk to a nurse about their concerns. The problem was that there was not enough time or nurses to fill such requests.

This experience with WIC families has many implications for what could potentially be done to improve child-rearing environments for those already under contact and asking for help: groups could be formed for prenatal preparation specific to the needs of these predominantly young mothers in socially disrupted circumstances; a supervised play area could be established near the appointment area with professionals serving as models in how to play, set limits, promote learning, etc. But all such possibilities are contingent upon the resources to do them.

Even if practice is not extended to include these and other exciting possibilities, however, it seems to us that some "critical mass" of resources is required before systematic screening/assessment can really become an integral part of nursing services. If personnel are so few as to be overwhelmed by the inability to meet existing service obligations, then superimposing additional information-gathering tasks, which only bring to light more needs for care which can not be met, is an exercise in futility and frustration.

Evaluations of the Protocols. The comments of the care personnel who participated in the field test centered around several major issues. Some thought the protocols lacked enough information on the physical problems of mothers and babies. To remedy this, one site added the Apgar score and any other specific physical indicators they wanted to include routinely. In others the nurses sought out additional information such as postpartum breast care, condition of the episiotomy, etc.

Parts of the screening information obtained duplicated existing information in some settings. This redundancy was remedied handily by the community agencies who were in the process of revising their existing forms; they set up a supervisory committee to incorporate the protocols for future use so as to eliminate all duplicated information.

Some participants thought parts of the information requested was too sensitive and they were somewhat surprised at patients' willingness to provide their perceptions of their babies and reports of their home support systems and recent life events. In one setting, however, a modification was tried to reduce the implication of sensitivity: rather than checking the specific life events experienced, mothers were asked to look at the list and only give the total count of their events. This modification was feasible since we had determined that the number of life events was highly correlated with the weighted score.

Feasibility of Obtaining Screening Information. Since we did not know the most critical time to observe a) newborn behavior and b) mother-infant interaction, the participating hospital staffs were asked to complete one of each of these observations each shift. For the 140 babies screened there were a total of 640 newborn behavioral observations. Table 9.2 shows that these observations were made by a variety of personnel; most (60%) were done by registered nurses, but LPNs, Aides, and nursing students also participated substantially. Overall, the different shifts observed about equal numbers, and most were done before 3 days of age (discharge typically occurs by then).

The frequencies of actual behavioral ratings in Table 9.2 can not be interpreted in terms of numbers of infants because they are based on total observations, with some babies having more than others. They do show some interesting trends, however. A relatively small proportion on any item were marked as "don't know" or not given a rating. There was a definite preference for the middle scale rating "2." A closer look at the data showed that non-RN personnel used the 2 scale position most frequently.

In order to obtain some indication of the validity of these infant ratings, full Brazelton Behavioral Assessments were done on a few of these

## TABLE 9.2

### INFORMATION FROM FIELD TEST HOSPITALS: OBSERVATION OF NEWBORN BEHAVIOR

| Variables | Frequencies (%)* | | |
|---|---|---|---|
| | Total | Hospital A | Hospital B |
| **Examiners' Title** | | | |
| RN | 60.3 | 50.1 | 85.4 |
| LPN | 4.5 | 2.0 | 10.8 |
| Aide | 20.3 | 27.9 | 1.6 |
| Student | 8.1 | 11.4 | 0 |
| Clerk | 0.5 | 0.7 | 0 |
| Unknown | 6.2 | 7.9 | 2.2 |
| **Shift** | | | |
| Day | 37.3 | 42.4 | 24.9 |
| Eve | 35.0 | 29.9 | 47.6 |
| Night | 27.5 | 27.5 | 27.6 |
| Unknown | 0.2 | 0.2 | 0 |
| **Day of Observation** | | | |
| Day of birth | 6.9 | 2.4 | 17.8 |
| Day after birth | 35.9 | 35.2 | 37.8 |
| 2 days after birth | 33.6 | 36.7 | 25.9 |
| 3 days after birth | 15.2 | 16.0 | 13.0 |
| 4 days after birth | 4.1 | 5.0 | 1.6 |
| 5 days after birth | 1.2 | 1.1 | 1.6 |
| 6 days after birth | 0.6 | 0.7 | 0.5 |
| 7 days after birth | 0.5 | 0.7 | 0 |
| 8 or more days after birth | 0.6 | 0.7 | 0.5 |
| Unknown | 1.4 | 1.5 | 1.1 |
| **Alertness** | | | |
| (1) doesn't attend | 22.2 | 16.0 | 37.3 |
| (2) follows with eyes | 50.6 | 57.1 | 34.6 |
| (3) follows with eyes and head | 22.8 | 22.4 | 23.8 |
| don't know or no rating | 4.4 | 4.4 | 4.3 |
| **Motor Maturity** | | | |
| (1) jerky most of time | 8.4 | 5.3 | 16.2 |
| (2) smooth half the time | 65.9 | 69.2 | 57.8 |
| (3) smooth most of the time | 23.6 | 23.7 | 23.2 |
| don't know or no rating | 2.0 | 1.8 | 2.7 |
| **Irritability** | | | |
| (1) never upset | 6.7 | 7.7 | 4.3 |
| (2) occasionally upset | 85.6 | 85.3 | 86.5 |
| (3) always upset | 3.4 | 2.8 | 4.9 |
| don't know or no rating | 4.2 | 4.2 | 4.3 |
| **Cuddliness** | | | |
| (1) not cuddly | 1.4 | 0.9 | 2.7 |
| (2) somewhat cuddly | 70.5 | 69.4 | 73.0 |
| (3) very cuddly | 24.2 | 26.6 | 18.4 |
| don't know or no rating | 3.9 | 3.1 | 5.9 |
| **Consolability** | | | |
| (1) difficult to quiet | 5.5 | 5.3 | 5.9 |
| (2) usually quiets | 70.3 | 68.1 | 75.7 |
| (3) easily consoled | 18.0 | 20.7 | 11.3 |
| don't know or no rating | 6.2 | 5.9 | 7.0 |
| **Concerns About Baby** | | | |
| Yes | 9.2 | 12.1 | 2.2 |
| No | 78.0 | 81.3 | 69.7 |
| No response | 12.8 | 6.6 | 28.1 |
| Total number of cases | 140 | 86 | 54 |
| Total number of observations | 640 | 455 | 185 |

*Frequencies based on number of observations

## TABLE 9.3

### INFORMATION FROM FIELD TEST HOSPITALS: OBSERVATIONS OF MOTHER FEEDING BABY

| Variables | Frequencies (%)* | | |
|---|---|---|---|
| | Total | Hospital A | Hospital B |
| **Examiners' Title** | | | |
| RN | 61.5 | 60.7 | 63.8 |
| LPN | 9.7 | 11.3 | 5.2 |
| Aide | 19.5 | 22.6 | 10.3 |
| Student | 2.6 | 3.0 | 1.7 |
| Clerk | 0.4 | 0.6 | 0 |
| Unknown | 6.2 | 1.8 | 19.0 |
| **Shift** | | | |
| Day | 67.7 | 61.9 | 84.5 |
| Eve | 27.0 | 33.9 | 6.9 |
| Night | 2.6 | 3.0 | 1.7 |
| Unknown | 2.6 | 1.2 | 6.9 |
| **Day of Observation** | | | |
| Day of birth | 4.9 | 4.2 | 6.9 |
| Day after birth | 31.4 | 34.5 | 22.4 |
| 2 days after birth | 31.4 | 32.7 | 27.6 |
| 3 days after birth | 14.6 | 14.9 | 13.8 |
| 4 days after birth | 4.4 | 3.6 | 6.9 |
| 5 days after birth | 1.8 | 1.2 | 3.4 |
| 6 days after birth | 0.4 | 0 | 1.7 |
| 7 days after birth | 0 | 0 | 0 |
| 8 or more days after birth | 0.4 | 0.6 | 0 |
| Unknown | 10.6 | 8.3 | 17.2 |
| **Mother's Verbalizations to Infant** | | | |
| (1) little or no talking | 14.6 | 13.7 | 17.2 |
| (2) uses voice to interact | 73.0 | 72.6 | 74.1 |
| (3) almost continuous talking | 11.9 | 13.7 | 6.9 |
| no rating | 0.4 | 0 | 1.7 |
| **Mother's Tactile Stimulation** | | | |
| (1) little or no touch | 8.0 | 8.3 | 6.9 |
| (2) uses touch to interact | 73.9 | 71.4 | 81.0 |
| (3) almost continuous touching | 17.2 | 19.6 | 10.3 |
| no rating | 0.9 | 0.6 | 1.7 |
| **Mother's Mood** | | | |
| (1) lacks affect | 10.2 | 10.7 | 8.6 |
| (2) animated | 72.6 | 72.6 | 72.4 |
| (3) intense affect | 15.9 | 15.5 | 17.2 |
| no rating | 1.3 | 1.2 | 1.7 |
| **Infant's Visual** | | | |
| (1) doesn't look at mother | 29.2 | 30.9 | [illegible] |
| (2) makes eye-to-eye contact | 60.2 | 62.5 | 53.4 |
| (3) looks at mother constantly | 4.9 | 0.6 | 17.2 |
| no rating | 5.7 | 5.9 | 5.2 |
| **Infant's Motor Activity** | | | |
| (1) little motor activity | 27.9 | 33.3 | 12.1 |
| (2) some motor activity | 67.7 | 62.5 | 82.7 |
| (3) much motor activity | 4.0 | 3.6 | 5.2 |
| no rating | 0.4 | 0.6 | 0 |
| **Concerns About Mother/Infant** | | | |
| Yes | 9.8 | 10.7 | 6.9 |
| No | 76.5 | 79.2 | 69.0 |
| No response | 13.7 | 10.1 | 24.1 |
| Total number of cases | 102 | 67 | 35 |
| Total number of observations | 226 | 168 | 58 |

*Frequencies (%) based on number of observations same babies at the two hospitals. Comparisons showed moderate agreement between the modal value for the multiple staff observations and the full scale rating.

Out of the possible number of mother-infant pairs a smaller proportion were observed interacting during feeding than were observed for infant behavior alone in the nursery. And a lower total number of observations were made on the ward compared to the number in the nursery (see totals in Tables 9.2 and 9.3). Comments from participants suggest this may be due in part to the timing required to make the observations precisely when feeding occurs. The fact that observation of mother-infant interaction is not usual practice as is observation of the newborn undoubtedly also contributes to these differences. The data in Table 9.3 show findings similar to the infant behavior observations in Table 9.2, except that day shift personnel were logically more involved than those on evening and night shifts.

As for the willingness of patients to provide information for screening, there were a few who refused to fill out the prenatal questionnaire. The rates of missing data for the hospital questionnaires following delivery are shown in Table 9.4. Those passing them out to patients said they would often agree to fill them out but somehow never had them completed when the staff returned for them. The highest rates of nonresponse (about 30%) are for the perceptual data such as the NPI, life change, and their concerns.

Missing information was also a problem in the community care settings for postpartum screening (Table 9.5). It is difficult to tell, however, whether the patients were reticent to give it or whether the personnel were reticent to ask for it.

Effect on Practice. Data from the postpartum screening in the health

## TABLE 9.4

### INFORMATION FROM FIELD TEST HOSPITALS: POST DELIVERY MOTHER QUESTIONNAIRE

| Variables | Frequencies (%) Total N=127 | Hospital A N=85 | Hospital B N=42 |
|---|---|---|---|
| Attend Prenatal Classes | 43.3 | 44.7 | 40.5 |
| Yes | 36.2 | 35.3 | 38.1 |
| No | 20.5 | 20.0 | 21.4 |
| Missing | | | |
| Pregnancy Interrupted Plans | | | |
| None | 29.1 | 27.1 | 33.3 |
| Very little | 24.4 | 27.1 | 19.0 |
| Moderate amount | 14.2 | 14.1 | 14.3 |
| Good bit | 5.5 | 4.7 | 7.1 |
| Great deal | 5.5 | 7.1 | 2.4 |
| Missing | 21.3 | 20.0 | 23.8 |
| Maternal Education | | | |
| 12 years or less | 47.2 | 36.5 | 69.0 |
| 13 years or more | 33.1 | 43.5 | 11.9 |
| Missing | 19.7 | 20.0 | 19.0 |
| NPI (Neonatal Perception Inventory) | | | |
| Positive | 36.2 | 37.6 | 33.3 |
| Negative | 30.7 | 29.4 | 33.3 |
| Missing | 33.1 | 32.9 | 33.3 |
| Mother has Concerns | | | |
| Yes | 26.0 | 27.1 | 23.8 |
| No | 40.9 | 41.2 | 40.5 |
| Missing | 33.1 | 31.8 | 35.7 |
| Mother's Concerns | | | |
| None | 41.7 | 42.4 | 40.5 |
| Caretaking | 6.3 | 5.9 | 7.1 |
| Breastfeeding | 3.1 | 4.7 | 0 |
| Siblings | 3.9 | 4.7 | 2.4 |
| Newness - First baby | 3.9 | 1.2 | 9.5 |
| Management of house and baby | 1.6 | 2.4 | 0 |
| Baby's health | 2.4 | 3.5 | 0 |
| Will baby be good | 1.6 | 2.4 | 0 |
| In-law problems | 0.8 | 1.2 | 0 |
| Other | 0.8 | 0 | 2.4 |
| Missing | 33.9 | 31.8 | 38.1 |
| Sum of Life Changes (Past 2 years ) | | | |
| 0-10 | 39.4 | 22.9 | 33.1 |
| 11-20 | 26.8 | 40.6 | 38.3 |
| 21-30 | 3.1 | 1.2 | 7.2 |
| Missing | 30.7 | 35.2 | 21.4 |

## TABLE 9.5

### INFORMATION FROM 54 POSTPARTUM TELEPHONE CONTACTS BY THE TWO HEALTH DISTRICTS IN THE FIELD TEST

| Type of Information | N | % | Missing Data N | % |
|---|---|---|---|---|
| Problem Areas Identified | | | | |
| Not married | 4 | 7.4 | 3 | 5.6 |
| Mother's age <19 or >30 | 16 | 29.6 | 3 | 5.6 |
| First baby | 36 | 66.7 | 7 | 13.0 |
| Infant perinatal complications | 15 | 27.8 | 10 | 18.5 |
| Maternal perinatal complications | 19 | 35.2 | 10 | 18.5 |
| Mother's education 12 years or less | 18 | 33.3 | 7 | 13.0 |
| Low physical/emotional support | 4 | 7.4 | 11 | 20.4 |
| Mother has many concerns and wants visit | 15 | 27.8 | 14 | 25.9 |
| Visit Scheduled | 29 | 53.7 | 13 | 24.1 |
| Nurse's reason for visit | | | | |
| Mother requested | (14) | (48.3) | | |
| Problem areas above | ( 7) | (24.1) | | |
| Other problems | ( 3) | (10.3) | | |
| No reason given | ( 5) | (17.2) | | |
| Total | (29) | (100.0) | | |
| Length of Phone Call (minutes) | | | | |
| 0-4 | 1 | 1.85 | | |
| 5-9 | 4 | 7.4 | | |
| 10-14 | 4 | 7.4 | | |
| 15-19 | 5 | 9.3 | | |
| 20-24 | 15 | 27.8 | | |
| 25-29 | 2 | 3.7 | | |
| 30-34 | 9 | 16.7 | | |
| ... | 0 | 0.0 | | |
| 75 | 2 | 3.7 | | |
| Not recorded | 12 | 22.2 | | |
| Total. | 54 | 100.0 | | |

districts (Table 9.5) shows that home visits were made on more than one-half of the cases; the largest reported factor in determining whether a visit was made was the mother's requesting it. In about one-third of the cases the nurses identified a specific problem area and in 17 percent there was no reason given for the visit. This suggests that the current trend is best reflected by consumer determination and that there is less systematic professional decision-making based on specified criteria. With limited resources the need for more systematic decision-making to determine the best use of nursing personnel is a high priority.

Without a more controlled trial and more staff orientation to act on the information obtained, it is difficult to say anything with assurance about the actual or potential effect on practice. Anecdotal evidence does show new care involvement with patients, given a broader screening perspective. Some of the staff said they now had a reason to interact with mothers, as well as substantive direction for counselling.

Comparison with our Study Findings. The problem of missing information in the field test largely negated comparisons with our study findings. Table 9.6, however, shows prenatal data which were fairly complete. The demographic characteristics of the prenatal and study groups were quite similar. Mothers reported equally high rates of lacking physical and emotional help during pregnancy. And some of their developmental expectations were even later than those of our sample. These findings suggest that these problems are present to a similar or greater degree in other groups and that they are worthy of attention in screening and care.

## SUMMARY

Our experience has shown that the combination of an environmental

## TABLE 9.6

## PRENATAL PROBLEM PROFILE FOR FIELD TEST HOSPITAL A AND OUR STUDY SAMPLE

| Problem Areas | Hospital A<br>N = 39<br>% | Study Sample<br>N = 193<br>% |
|---|---|---|
| Age $<$19 or $>$30 | 18.4 | 13.0 |
| Single | 0 | 11.3 |
| Education--high school or less | 51.3 | 43.5 |
| Children at home--none | 71.8 | 100.0 |
| Totally displeased when found out pregnant | 0 | 0 |
| Mixed feelings--displeased about pregnancy now | 2.6 | 7.7 |
| Not enough physical help | 7.9 | 8.6 |
| Not enough emotional help | 15.4 | 15.8 |
| No one gives physical help | 2.6 | 3.2 |
| No one gives emotional help | 2.6 | 2.1 |
| Baby sees after 6 months | 0 | 1.2 |
| Baby hears after 6 months | 2.6 | 0.6 |
| Baby learns after 6 months | 7.7 | 5.1 |
| Life changes since pregnancy above 300 | 2.6 | 0.5* |
| Life changes 1 year before pregnancy above 300 | 2.6 | 2.1 |

*For our sample, this figure represents life changes during the first trimester; women in the hospital group were 4-6 months pregnant when the Prenatal Questionnaire was completed.

perspective and screening and assessment techniques for systematic documentation is useful in helping families with problems. And they can contribute to improving the quality of the developmental environment for children in group care settings.

Most of the information-gathering techniques used in this project can not be directly applied to health care by those unfamiliar with them; they require training, an understanding of what the information means and why it is important, and the skills to follow through responsibly with care. Continued research will increase our knowledge about the importance of specific pieces of information and the most beneficial ways to provide care which can help.

After their recent study Yarrow and his colleagues stated:

> Developmental research still seems to be asking complex questions in oversimplified form. We have been limited by our simple theoretical models and statistical techniques in trying to deal with very complicated issues. Although it is meaningful to ask to what extent a given environmental variable makes a contribution to some aspect of infant functioning, we also need to ask more complex questions about how environmental variables interact with each other and how organismic and environmental variables interact. We need integrative models to consider the larger environment, to take into account many variables acting together on the infant, to consider contextual variables as well as direct influences. (Yarrow, Rubenstein, and Pedersen, 1975, p. 174.)

In our study we made every attempt to consider the context of the larger environment and the indirect as well as the direct influences. We too realize, however, that further work remains to be done in understanding the complex interaction of the multiple forces which shape the child's developmental world. Our plans for continued analysis include searching for new ways to construct composite patterns from our infancy data. We encourage others to join in trying to develop explanatory family typologies which can serve not only theoretical purposes but also utilitarian ones in care decision-making.

We would also like to encourage further replication studies of the assessment framework depicted in our conceptual model. These are especially needed in different types of family populations. But even before we get to the point of more precise predictive screening and assessment capabilities, we have enough evidence to know that the quality of the environment is important to children and that there are different tacks we can take as professionals to be sensitive to the setting of child development. The value of the systematic assessment perspective has already been recognized in nursing education and is being adapted in current textbooks (e.g., Erickson, 1976; Clark and Alfonso, 1976). Many of the concepts and methods from our study have been incorporated by health care professionals in our own university setting, both at the generic and graduate levels.

This awareness, this sensitizing process is the result we consider most important to share from our work to date. Recently we received an additional opportunity to disseminate our findings emphasizing this perspective. The Nursing Child Assessment Satellite Training Program is funded by the Division of Nursing, Health Resources Administration, D.H.E.W.[1] Different visual and television modes will be used in a series of classes beamed at sites across the country to present our findings in an educational format.

Our field test showed that systematic information-gathering procedures can be incorporated into existing practice routines. Even using simplified versions of the assessment methods as we did, because we did not have the resources to provide training in the short field trial, individual personnel did show increased awareness of such factors as maternal perceptions and mother-infant interaction. With these insights they were able to follow through with some of the implications for care. We caution strongly, however, that adequate training and knowledge are basic requisites so that the intent of systematic assessment is not lost through irregular interpretations. The logical place to provide these requisites is in formal basic and specialty programs. But to do so will demand a new orientation by nursing educators.

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[1] Contract #231-76-0014, Kathryn Barnard and Robert Hoehn, Co-investigators.

Receptivity to new methods, such as screening and assessment, varies across personnel dependent at least in part on such things as adequate orientation, supervisory encouragement, and a basic level of resources to accomplish the work load. But our experience strongly suggests that, given adequate preparation and facilitative settings, the perspective and methods of our project do increase the sensitivity of those open to trying new ways of practice. And they do open many new possibilities for care strategies based on the documented characteristics and strengths of different families and their children.

At this time we can only estimate the importance of specific variables which can best serve as high risk characteristics in practice settings. As we have pointed out repeatedly in this report, we do not yet know which characteristics and combinations are predictive of later child development problems. So it is with some temerity that we specify the factors we believe to be important to children in their developmental course. But such a summarization does show the situation as we perceive it based on our work to this point. And it does serve as a baseline for further refinement in the future.

We have stated this summary in terms of an "optimal" parent-infant profile. If our eventual findings follow the trend of others (e.g., Prechtl, 1967), it will be more feasible to predict those without problems than those with problems. What we work toward then is the epidemiology of healthy development. This approach not only stresses the quality of life; it also provides more direct inferences about what needs to be done to promote positive situations and outcomes.

The following table, Nursing Child Assessment Project, Optimal Parent Infant Profile, is a compilation of information that we have identified as being important during pregnancy and the first year of life. The table lists the variable sets that were used in the study. These involve the variables related to the mother and family, aspects of the psychosocial support, the amount of life change, the parents' developmental expectations, the mother's health, the mother's perception of the infant, the infant's health and behavior, specifically the infant's sleep-activity patterns, and, finally, the mother-infant interaction and the general stimulation of the home environment. We feel that the model proposed in Chapter 8 suggesting the interplay of forces between the child, parent and environment is an extremely crucial part of any comprehensive screening and assessment plan in an endeavor to predict infants and young children who are more vulnerable for development. We feel that one of the major outcomes associated with the assessments developed, particularly the environmental measures in this study, have to do with parenting outcomes and that through identifying the parents' supporting environment, their style and ability to adapt, and the characteristics of the child, a sound basis for proceeding with decision-making about the growth-fostering potential of the child's environment is highly probable.

## NURSING CHILD ASSESSMENT PROJECT
## OPTIMAL PARENT-INFANT PROFILE[1]

| | Prenatal | Newborn | 1 Month | 4 Months | 8 Months | 12 Months |
|---|---|---|---|---|---|---|
| Mother's Psychosocial Assets | Is pleased about pregnancy<br>Has someone to share concerns with<br>Has enough physical & emotional help<br>Planned the pregnancy<br>Little disruption in plans | <------Is satisfied with marriage------><br><------Has positive feelings about motherhood------><br><------Is satisfied with father's involvement in child care------><br><------Has positive experiences with motherhood------><br><------Has adequate help in home------> | | | | |
| Father Involvement | <------Living with family------><br>Pleased about pregnancy<br>Gives physical & emotional help<br>Shares mother's concerns | <------Moderate or high participation in child care------><br><------Is concerned about child's welfare and development------> | | <----Participates in teaching child----> | | |
| Parent Mutuality | <------Do joint decision making------> | <------Agreement on child rearing------><br><------Agreement on discipline------> | | | | |
| Life Change | <------Low------> | | | | | |
| Parents' Developmental Expectations | Realistic about when infant sees, hears, is aware, etc.<br>AP classes | <--Recognize increasing social responsiveness--> | | <----Expect increasing child mobility, curiosity, and independence----> | | |
| Mother's Health | No perinatal complications[2]<br>Recommended AP & PP care<br><------Few health problems------> | | | | | |
| Infant's Health | No perinatal complications[2] | <------Normal growth pattern------><br><------Minimal illness------><br><------Few accidents, none serious------><br><------Recommended well-child care------> | | | | |
| Maternal Perception of Infant | Pleased anticipation | <--Perceives infant positively compared to other children--------> | | | | |
| Infant Behavior | | Alert for good interaction<br>Smooth, coordinated motor behavior<br>Habituates to repetitive stimuli<br>Cuddly<br>Consolable<br><------Moderate motor activity------><br><------Low irritability, predominantly good mood------> | Responds with looking, movement or makes sounds<br>Attends to mother's presence, especially voice | Socially modulated behavior<br><---attends to specific stimuli-------> | Initiates behavioral interactions more frequently<br>More verbal<br>Increased mobility such as crawling | More exploratory behavior<br>Uses movement, looking, listening for a purpose |

Optimal Parent-Infant Profile (continued--page 2)

| | Prenatal | Newborn | 1 Month | 4 Months | 8 Months | 12 Months |
|---|---|---|---|---|---|---|
| Infant Sleep-Activity Patterns | | | Shows progressively regular patterns of sleeping & eating<br>Has at least 4 feedings/ day | Sleeping through the night← | ←---Begins to have night awakenings again, but frequency not problematic to parents | |
| | | | | ←----Regularity of night sleep---------→ | | |
| | | | | ←-- -Infant can adapt to changes in his daily routine------------→ | | |
| Mother-Infant Interaction | | | ←----Mother is comfortable during interaction---------→ | | | |
| | | | ←------------Mother facilitates learning-------------→ | | | |
| | | | | ←------Mother encourages exploration of toys and objects------------→ | | |
| | | | ←------------Mother provides positive feedback--------→ | | | |
| | | | | | ←--Mother does not use forcing controlling techniques-----------→ | |
| | | | ←--------Infant demonstrates readiness to learn and involvement-----------------------→ | | | |
| | | ←----------Mutuality and adaptation of mother and infant behaviors in routine caretaking activities such as feeding------------------------------------------→ | | | | |
| | | | | | ←---Infant becomes more adaptive-------→ | |
| Stimulation in the Home Environment | | ← - - (not measured) - - - | | ←-----High emotional & verbal responsivity to child-----------→ | | |
| | | ← - - - " - - " - - - - - | | ←-----Low restriction & punishment-----→ | | |
| | | ← - - - " - - " - - - - - | | ←-----Temporal environment organized---→ | | |
| | | ← - - - " - - " - - - - - | | ←-----Appropriate play materials provided-----------------------→ | | |
| | | ← - - - " - - " - - - - - | | ←-----High maternal involvement with child---------------------→ | | |

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[1] The timing for specific entries is determined by the age of most importance and by the age at which the dimension was measured in this study.

[2] As listed in Appendix 2.1.

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